TRANSACTIONS

OF THE

FIFTH ANNUAL MEETING

OF THE

AMERICAN LARYNGOLOGICAL, RHINOLOGICAL, AND OTOLOGICAL SOCIETY.

HELD IN

CINCINNATI, OHIO,

JUNE 2 AND 3, 1899.

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ADDRESS OF THE PRESIDENT,

S. E. SOLLY, M.D.

I have the pleasure of welcoming you to the fifth annual meeting of our society and to congratulate you upon its growth and prosperity. The trite saying that it fills a long felt want is certainly applicable in speaking of the utility of our institution. That you have done me the honor to elect me your president, I regard as evidence of the recognition of that class of practitioners, who, while treating a considerable number of nose, throat and ear cases, do not entirely confine their practice to that specialty. The fact that there are so many hundreds of men who are doing good work in these branches all over the country who are not pure specialists is an indication of the recognition of the value in the general practice of medicine, of the knowledge and skill in treating these diseases. So many cases of nasal and laryngeal disease are overlooked and neglected on account of the ignorance of this department of medicine among general practitioners; and also, too often among medical consultants. In the larger cities, of course, it is natural and best that certain men should devote themselves exclusively to the treatment of the diseases of the upper air tract; but in less populated places it is desirable that the general practitioner should have a more thorough knowledge and capacity for the treatment of these cases than he usually has, and this Society, which allows such general practitioners to stand

alongside the specialists, is fulfilling a great purpose. Both classes of physicians can learn from each other; and our gatherings serve to keep the specialist in touch with general medicine, which is essential to his best success, and, on the other hand, enables the general practitioner to acquaint himself, and keep abreast, with the progress of this special art.

The subject to which I wish particularly to call your attention to-day is the unity of the respiratory tract; that while a nose and throat specialist should know all that can be learned about the upper air tract, he should also be competent to make a diagnosis of pulmonary disease, and be acquainted with the general signs of an early or latent tuberculosis, and, more frequently than is customary, to extend his investigations below the larynx. On the other hand, the medical consultant who is an expert upon affections of the chest should either examine or cause to be examined, the upper tract in many more cases than he usually does.

It is not necessary, in addressing you, for me to explain the anatomical and physiological relation of the nose, larynx and lungs, or to insist on their frequent connection in pathological conditions. The facts are admitted, but practical and intelligent action taken upon these facts is much more rare than perhaps many of you suppose. As explaining why I feel justified in addressing you on this subject I must be pardoned for speaking egotistically for a brief space. I have practiced in Colorado for nearly twenty-five years, where I have had under my care, and generally prolonged observation, a very large number of persons affected in some portion of the respiratory tract, who, for the most part, were subjects of tuberculosis. During this time I have never ceased to rejoice that previous to coming to Colorado, while practising in London, I studied and worked under that great laryngologist, Sir Morrell Mackenzie, and that I have since endeavored to keep up with the progress of the specialty. The reason is because I have found so many cases of pulmonary disease in which the condition of the nose and throat was such that it had evidently influenced the causation of the lung affection; or that it was interfering with its progress toward recovery, and if left unrelieved was liable to make the cure incomplete, or occasion a relapse. On the other hand, in cases coming to me for treatment of the nose and throat I have not infrequently found that there was also disease in the chest.

For some years in my first examinations of patients coming to me with pulmonary tuberculosis I did not examine the nose and

throat, unless there was some special reason for doing so, but for the last few years I have made this examination a routine practice, as I have found that many patients who do not complain of nose and throat symptoms nevertheless have affections of this region, which are important to recognize, and often to treat. I believe, therefore, that in all cases of chronic pulmonary disease the upper air tract should always be inspected.

Not infrequently patients in whom I have found abnormalities of the nose, but which had not attracted the attention of the physicians who had sent them to Colorado, have only been consciously inconvenienced by these affections after residence in Colorado. Probably because the dryness, dustiness and diminished pressure of the air increased the turgescence of the mucous membrane, and especially of the turbinate bodies. This by diminishing the lumen of the nasal passages causing more or less stenosis to arise where there was an exostosis or divergence of the septum, which at sea level had caused no important obstruction; such obstruction having previously given rise to discomfort only when the mucous membrane was swollen by a passing catarrh. Such cases complain of chronic catarrh in Colorado and are comfortable still when they return to sea level.

As a rule it is best to remove the septal prominences, because when those possessing them take cold they are more liable to have secondary affections of the respiratory tract lower down. The same rules, of course, apply more or less to other interferences with perfect nasal breathing, such as chronic hypertrophies of the turbinates, polypi, etc., which have escaped notice until the influence of the air of Colorado has called the physician's attention to them.

It has been my practice for some years to take a careful history of the patients previous to their development of tuberculosis, and I find that in the cases in which there is a history of frequent attacks of bronchitis and catarrhal pneumonia there generally exists more or less nasal stenosis. The number of those in whom nasal abnormalities are present would appear to be still more frequent among the cases that are subject to naso-pharyngitis, tonsillitis, and laryngitis.

The influence of nasal obstruction upon catarrhal affections of the chest, it is conceded, is largely due to mouth breathing during attacks of nasal catarrh and to exposure to damp, chilly weather. As I have said, marked nasal obstruction in these cases being only temporary, has not attracted the attention of their attending phy-

sician. Where pulmonary catarrh has resulted, no doubt a soil was created for the growth of the bacillus in the lower respiratory tract, while in those who have had tonsillitis it is likely that the bacilli have found an easier entrance than usual from the tonsils into the lymph vessels.

Again, in cases of unilateral nasal obstruction a catarrh of the nasal pharynx has probably allowed a readier lodgment of the bacilli in the naso-pharynx because of a sluggish air current behind the obstructed side and an entrance into the system through the glandular structure in this region. There are also cases of catarrhal affections of the upper air passages in which there may be no stenosis which, nevertheless, may have afforded a ready entrance for the tuberculosis. I believe that the treatment of these affections has enabled those in whom the tuberculosis has become arrested to return to their homes and occupations with much less danger of renewed catarrhal attacks and so much lessened liability to recurrence of the tuberculosis.

As an aid to the arrest of pulmonary tuberculosis, treatment of diseased conditions of the nose and throat are often of the greatest service. The cough is frequently and noticeably diminished, particularly, of course, where there has been an elongated uvula, or a hypertrophy of one or more of the tonsils. For these reasons I believe that where a chronic affection is discovered the entire respiratory tract should be investigated and that in about 50 per cent. of the cases more or less treatment of the upper air tract is called for. It is very difficult at present to prove the truth of this belief by statistics. Dr. E. F. Ingals made a statistical inquiry into the relation of nasal disease to pulmonary tuberculosis, which he reported before the British Medical Association, at their meeting in Montreal, two years ago.* Any communication from a physician of such wide experience and eminence in the treatment of the nose and throat is entitled to the greatest respect and consideration. He offers an analysis of 14,953 cases. Of these, 1272 had phthisis; 4714 had nasal disease without phthisis; 237 had nasal disease with phthisis; 6058 had neither phthisis nor nasal disease. In considering the question of nasal disease in the causation of phthisis, he very properly writes that it is necessary first to ascertain what is the proportion of nasal disease to the general population. He estimates that 46 per cent. is the ratio of well-marked nasal disease to the

* The Relation of Nasal Disease to Tuberculosis. By E. F. Ingals. *British Medical Journal*, Nov. 13, 1897.

population, and he concludes from his own statistics that the population of cases of phthisis among those with nasal disease is less than the proportion of cases of phthisis to the whole population. He, however, excepts atrophic rhinitis, in which disease he finds the proportion is greater. In arriving at his conclusions he says that Delavan, in an examination of some 2000 skulls, found exostosis or deviation of the septum in 50 per cent. He himself estimates that 25 per cent. more of the population had other nasal affections. He, therefore, concludes that about 75 per cent. of the human race have nasal disease. He further says that it is believed that 12 per cent. die of pulmonary tuberculosis, while the number of those who recover is not known, but in 25 per cent. of the autopsies made upon people dying from other diseases there had been found evidence of old pulmonary tuberculosis. So, it may be inferred that 37 per cent. of the human race suffer from pulmonary tuberculosis as against 75 per cent. who have nasal disease, and it is also probable that many cases of both diseases escape record. Dr. Ingals expresses his astonishment at these results, and admits they are opposed to his clinical conclusions.

For my part, I cannot but believe that there is some fallacy in his statistics, which is not at present apparent, and one naturally demurs to his deduction that disease of the upper air passage exerts a deterrent influence upon pulmonary tuberculosis.

Dr. W. Freudenthal* thus comments on Dr. Ingals' paper:

"Dr. Ingals says that of these 38 per cent. with tuberculosis comparatively few suffer from nasal disease. Thus, for example, of his 830 cases of pulmonary tuberculosis only 237, or about 28 per cent., showed some nasal trouble. 'Of the 237 cases which make up this 28 per cent. I find that 168 consisted of exostosis and deflection of the septum, which . . . is present in 50 per cent. of all persons of the European race; *therefore, many of these would have had no possible influence* in causing the pulmonary tuberculosis.' I fail to see the logic of Dr. Ingals' conclusions. Because 50 per cent. of all Europeans have deflections of the septum, must we exclude them from our statistics? Are deflections of the nasal septum to be considered normal because so many civilized people have acquired them?

"Deflection of the nasal septum is a pathologic condition which also tends to produce post-nasal catarrh, and I consider it a very important etiologic factor in favor of our theory. But

* *Annals of Otology, Rhinology and Laryngology*, p. 173, February, 1898.

Dr. Ingals goes on to exclude other possibilities by saying: 'Further, my records show that of all the cases of pulmonary tuberculosis, 1271 in number, only 27 of the patients or about 2 per cent. complained of having had any previous nasal disease, which is 4 per cent. less than the normal average.' His position must be very weak if he is forced to fall back on such arguments. Were we to be guided by the complaints of the patient we would, for instance, still have to treat many cases of persistent headache as malaria and fill the patient with quinine and similar drugs, as we formerly did. We would never be justified in removing polypi, etc., in cases of asthma because the patient does not complain of his nose."

Dr. Freudenthal goes on to refer to his examination of the nasal passages of 500 patients in the New York Hospital for the Ruptured and Cripples, in which he found numerous cases of serious nasal disease among those who did not complain of their nose or throat. Again, he says of 75 consumptives at the Montefiore Home, 38 complained of their noses or throats, and of the remaining 37 who did not complain no less than 23 showed abnormalities in their nasal passages, and in only 14 were there no marked changes at all.

In the same article he expresses the belief that the majority of cases of permanent tuberculosis receive their initial infection from a diseased mucous membrane in the naso-pharynx. His article is well worth reading, and furnishes sound, though not absolutely conclusive, evidence in support of his theory.

He believes that partial obstruction of one nostril allows germs to settle upon the same side of the naso-pharynx with comparatively little disturbance, by air currents. Some observations of my own lend support to this theory. In a paper read by me before the Colorado State Medical Society, at their meeting in Denver, June, 1894,* I reported the results of analysis of 200 cases of pulmonary tuberculosis. These cases were not in any way selected, but taken in the order in which they presented themselves to me for their first examination, running back from a recent date. Of these 200 chest cases, 33 had also nasal disease, 38 also laryngeal, and 23 had both in addition to their lung affection, making 56 with nasal and 61 with laryngeal complications; only clearly marked cases being noted.

* The classification was made from the side upon which the chief cause of the disease appeared to be, rather than where its worst symptoms might happen to be exhibited later in its course.

The nasal cases were divided: 1st, into those in which the disease was most evident or was known to have commenced, or existed solely or mostly on one side more than the other, and these again into right or left; and, 2d, into those in whom the amount of disease or obstruction appeared about equal, and in whom there was no clear evidence of its having begun on one side more than the other, these being grouped for convenience under the head of median.

For the purpose of the inquiry as to the relation of the nasal disease to the pulmonary, the cases were again classified under right, left and median, with regard to their pulmonary disease. The side of the chest in which the symptoms first appeared, or in which it was most manifest deciding the heading, while those in which the disease was about equal on both sides, or the side of origin was unknown, or had apparently begun on both sides at once, are classified under the head of median.

Defined in this way, it was found that of the nasal cases in 24 the disease appeared to have originated upon the right side and 14 upon the left. Of the 24 cases of right nasal disease the right lung was primarily or chiefly affected in 17, the left in 1, both equally in 6. Of the 14 cases of left nasal disease, 8 were primarily affected in the left lung, 4 in the right, and 2 equally in both. So that in the 38 nasal cases where the disease could be classified right or left, 65.8 per cent. had their lung disease primarily or chiefly upon the same side as the nasal disease. It is interesting to note that the case of right nasal disease in which the lung disease was on the opposite side, was one where stenosis of the right nostril had been caused by fracture of the septum, and of the 4 cases of left nasal disease where the pulmonary disease was on the right side; 1 also was known to have been a traumatic stenosis.

I have recently made a similar analysis of 100 cases of pulmonary tuberculosis, taking them in the order in which they presented themselves for examination. Of these I find 54 had also nasal disease. Of these 54 cases 31 had septal deformities, causing more or less stenosis. The remaining 23 had naso-pharyngeal catarrh without marked stenosis on either side, and in whom there was no septal disease giving rise to obstruction.

Of the 31 cases with nasal disease the stenosis was present and most marked in the left nostril in 21, and in the right nostril in 10. The left lung was chiefly or solely affected in 14; the right lung was chiefly or solely affected in 17. There was laryngeal

disease in 29 per cent. of the 31 cases. Of the total 100 cases, 25 had laryngeal complications, of which 21 had tubercular laryngitis and 4 simple chronic laryngitis. Five of the laryngeal cases were without nasal disease. Of the 4 cases of chronic laryngitis, all had nasal complications; and of the 21 cases of tuberculous laryngitis 16 had nasal complications.

Of the 31 cases of septal deformities there was marked stenosis, the deformity obstructing the nostril on the same side of the body as the lung, which was the first and usually the most seriously affected, in 20 cases; that is, in 64.5 per cent., very nearly the same proportion as in the previous analysis of 200 cases just referred to, in which it was 65.8 per cent. In considering the cause of this curious symmetry between the nasal and pulmonary affection I wrote as follows:

"The facts would appear to suggest an underlying cause in a common deficiency of resistance to disease or injury on the same side of the body, which was probably caused by a pre-natal or post-natal imperfection of development or growth, either congenital or acquired by circumstances or habit; this developmental deficiency being one of nutrition or innervation, or both."

While this may possibly account in a measure for the nasal obstruction, and also for the progress of the pulmonary disease, yet I am inclined to agree with Dr. Freudenthal's theory, and to think that the bacilli in many cases find the readiest point of entrance in the naso-pharynx behind the obstruction. These facts, and the theories deduced from them, appear to me to enforce the wisdom of treating the respiratory tract as a whole.

PAPER:

DILATATION OF THE HEART, COMPLICATING OBSTRUCTIVE LESIONS OF THE UPPER AIR PASSAGES.

BY JOHN A. THOMPSON, M.D.

It is well known to the profession that the lungs are chronically congested in valvular heart disease, especially in mitral insufficiency. It is not well known that the pharynx and turbinated bodies in the nose are also overfilled with venous blood in this disease. So long as compensation is perfect the condition of the heart does not affect any disease in the upper air tract. When compensation fails, the impaired circulation makes the cure of nasal and pharyngeal inflammations impossible. The effect of this venous congestion on the prognosis of diseases in the upper air tract has not been given sufficient attention in the literature of laryngology. There is not, to my knowledge, any suggestion by any medical writer that the contrary proposition may be true. That is, that obstructive disease in the nose or throat may produce a dilatation, if not an actual valvular disease, of the heart. Some cases I have treated suggest so strongly this teaching that I have concluded to put my observations on record. The great court of last resort in medicine, the general profession, may then decide whether or not the symptoms seen in these cases have been correctly interpreted. The following cases are chosen out of many I have seen because they are typical of different forms of this disorder.

W. J. T., aged 39, large, robust appearing man, a farmer by occupation, consulted me in October, 1894, in regard to obstructed respiration. Slight hypertrophic rhinitis was found, and a large spur in the left nostril growing from the septum nasi. No general examination was made at the time, but the spur was removed under cocaine anesthesia. There was temporary heart failure from the cocaine at the time of operation, but the symptoms were not serious enough to be alarming. An examination of the chest, made three days after the operation, showed a slight passive congestion of both lungs and a markedly dilated left ventricle, with the apex beat to the left of the nipple line. There was a loud mitral regurgitant murmur, which was heard

by Dr. Oliver as well as myself. The pulse rate, when he was sitting quietly in the office, was 120. The patient was given tincture of digitalis, ten minims, four times a day, and a spray of menthol and camphor for the nose. He was placed in the care of his home physician until the pulse rate should be normal. He returned to his home one week after the operation. I examined him there one year later, and found him with a pulse of 72, the heart contracted to its normal size, no murmur, no cough, no pulmonary congestion, and no obstruction of the nose.

J. E. G., aged 23 years, a very tall, slender blond, consulted me in August, 1898, in regard to an obstruction of the left nostril, which interfered with free respiration. He had atrophic rhinitis. The septum nasi was deflected to the left, and a large spur was in contact with the outer wall, touching the inferior turbinated body. This growth was removed by the ordinary method. As is usual in cases of atrophic rhinitis, healing was somewhat delayed. After all the obstruction had disappeared, the patient was still somewhat short of breath. Examination showed the apex beat of the heart in the nipple line. The left ventricle was considerably dilated. The pulse rate was 90 per minute. There was no valvular murmur. He was given tincture of digitalis, ten drops after each meal. October 12th the pulse rate was normal, and the dyspnea was entirely relieved.

I was asked March 4th of the present year, by Dr. A. R. Walker, to see F. B., aged four years, for the purpose of removing hypertrophied tonsils and adenoids. Having great confidence in the doctor's diagnostic skill, I went as requested, prepared to operate. The patient was an undersized, poorly developed child. With the exception of his throat trouble he had always been healthy. The family physician had not had occasion to examine the chest. Making the routine examination before deciding what anesthetic to give, the heart was found with the apex beat in the axillary line. The area of cardiac dulness was greatly increased in every direction. A loud systolic murmur was heard over the apex. The pulse rate was 118 per minute. The operation was postponed, and the child given tincture of digitalis, eight drops four times daily. April 8th the pulse had been reduced to 100-108 per minute, and was full and strong. The operation was then made, under ether anesthesia. The operation and recovery were uneventful. The heart has contracted some, but the murmur is still present.

January 7th of the present year I examined Miss J., aged 7

years, for Dr. A. D. Birchard. Hypertrophied tonsils and adenoids were diagnosed and their removal advised. The child was nervous and frightened, and to this the high pulse was attributed, both at the first examination and on the day of operation. Two days after the operation it was noticed that the child frequently took long sighing respirations, as though she was always short of breath. The mother then told me she had noticed this symptom for several months. An examination of the chest showed the lungs slightly congested and the heart considerably dilated. The apex beat was a half inch to the left of the nipple line. The pulse varied from 120 to 130 per minute. There was no murmur. Convalescence from the operation in this case was interrupted by an eruption of measles on the fifth day after the operation. When the fever from this intercurrent affection had disappeared she was given digitalis. The drug was not administered as long as was desirable. At a recent examination the heart was found to be smaller, but has not yet returned to its normal size. There is no dyspnea.

Another phase of the clinical picture presented by patients with obstructed nostrils and dilated heart was shown in the case of Rosa R. She is a tall, thin, anemic girl of 23. She consulted me in November, 1898, complaining that all the symptoms of a hypertrophic rhinitis, for which I had treated her seven years before, had returned. In addition to the nasal symptoms there was marked dyspnea on exertion. The nose did not show on examination the color of hypertrophic rhinitis, but that of venous turgescence. The turbinated bodies did not contract quickly or completely when cocaine was applied. Examination of the chest showed the lungs congested and the area of cardiac dulness increased. The apex beat was in the nipple line. The pulse rate was 120 per minute. There was no murmur. This was a case where the nasal symptoms were not due to a recurrence of a former disease, but to impaired circulation. Local treatment had little effect on the nose until the pulse rate had been reduced by digitalis to 90 per minute. Then the nasal stenosis and accumulation of secretions were relieved.

The knowledge that obstructive lesions of the upper air passages are occasionally complicated by weakening and dilatation of the heart is important to every practitioner of medicine. The family physician can save himself embarrassment and damage to his reputation by a careful examination of the chest before referring such cases for operation. The operator must know the

condition of the heart before inducing either general or local anesthesia. Local treatment of a mucous membrane filled with venous blood does little good. Success in the class of cases just described demands a combination of local and general treatment.

PAPER:

MULTIPLE PAPILLOMATA IN MOTHER AND CHILD.

BY JOHN O. M'REYNOLDS, M.D.

Without going into the details of the subject, I will briefly refer to those features which were of special interest. The mother was a young, strong, beautiful, and cultured woman, of splendid character and social standing, and the only deviation from normal health was a mild rheumatic condition associated with numerous papillomata in the pharynx. The child was two years old, of robust constitution, and the only abnormal condition was that of multiple papillomata of the tongue. The tumors developed simultaneously in the mother and the child, and their true character was verified by a careful microscopical examination of some of the growths surgically removed. There was absolutely no history of specific infection in any of the ancestors of the child, but a few weeks preceding the development of the papillomata the child had a rather severe and persistent eruption about the mouth, which was probably the seat of the primary lesion, and the disease most likely was derived from a negro nurse employed in the family. Specific treatment promptly caused the growths to disappear from both patients, and they have never returned. The rheumatic condition in the mother sometimes returns, but is immediately arrested when antisyphilitic treatment is resumed. And now, after a lapse of three years, both patients are in perfect health, and neither patient has developed any other symptoms pointing to specific infection.

PAPER:

THE FACIAL NERVE IN ITS RELATION TO THE AURIST.

BY GEO. L. RICHARDS, M.D.

I have chosen this subject to present to you because I have thought for some time that an insufficient amount of attention was being given to this nerve in aural literature. Facial paralysis is more common as an aural complication than the current literature of the subject would lead us to expect or else my personal experiences have been especially unfortunate.

That the subject is a neglected one from the text-book standpoint is easily proven by a reference to the new "American Text-Book of Diseases of the Eye, Ear, Nose and Throat," where no reference to the subject of facial paralysis can be found in either text or index. When it is recalled that the editor of the aural division of this book is one of our most distinguished American aurists, the contempt in which the subject is held is apparent. With the exception of the text-books of Politzer, Bacon, Barr and Bishop, those books which treat of the subject do so in such a manner as to imply that the accident of facial paralysis is not of so much account after all. The index of Dr. Dench's book on the ear contains no reference either to the facial nerve or to facial paralysis, but there are several short references to the nerve and its paralysis in the text, giving its anatomy, its possibility of affection in purulent and inflammatory affections and of damage in mastoid operation, ending with the astonishing statement that injury of the facial is not a serious accident, as its function is in most cases restored in from three to five weeks under the use of the faradic current.

While I am willing to concede that affections of the facial nerve bear no relation in severity or danger to others that may occur in the aural region or be associated with the facial trouble, yet I regard facial paralysis as a by no means trivial condition; on the contrary, it is a most distressing one, producing what Bishop well calls a shocking deformity. The possibility of its occurrence is always to be borne in mind by the aurist, avoided whenever possible, and always treated as a serious condition. To the aurist in a large metropolitan district the occasional case of

facial paralysis occurring in connection with some ear operation may not matter, but to the dweller in a small city, like myself, the presence of a person or two in the city with face drawn to one side, unable to laugh or properly close their mouth, to whistle or to close their eyes is an advertisement not to be desired. Especially is this the case if, for any reason, the doctor is given the credit of having produced the condition. Then it is freely given out that doctor so and so operated on the ear, and ever since the face has been crooked. Perhaps the operation was the result of some urging on the part of the physician and the patient now wishes it had not been done. This condition of facial paralysis is a walking advertisement of the worst kind, visible to all men. Most of our aural surgery is absolutely concealed, but this part of it, or complication of it, appears on the face, where he who runs may read. It was said in a derisive way by the assistants in the eye department of the Halle Clinic that all of Schwartze's mastoid patients had facial paralysis. This was very far from the truth, though it did occur now and then. Schwartze was always on the lookout for the accident, and warned his students to be.

References to anatomy before this society are no doubt entirely superfluous, yet I cannot refrain from a brief review of the topographic anatomy of the facial nerve before going on to point out conditions in which I regard it as of concern to the aurist. Arising from the medulla it enters the internal auditory meatus with the auditory nerve, lying first to its inner side and then in a groove upon it and being connected with it by one or two filaments. At the bottom of the me atus it enters the acqueductus Fallopii and follows the serpentine course of that canal through the petrous portion of the temporal bone, from its commencement at the internal meatus to its termination at the stylo-mastoid foramen. It is at first directed outward towards the hiatus Fallopii, where it forms a reddish, gangliform swelling, the geniculate ganglion, and is joined by several nerves; then bending suddenly backward, it runs in the internal wall of the tympanum, above the fenestra ovalis, and at the back of that cavity passes vertically backward to the stylo-mastoid foramen. Here it divides into main branches after passing through the substance of the parotid gland and supplies the muscles of expression of the face. Within the aqueduct it gives off the tympanic branch to the stapedius and the chorda tympani. Topographically it is in close relation to the foramen oval, the distance from the canal at this

point being but a few lines. It is also in close proximity to the deeper mastoid cells and close to the inner tympanic wall above the foramen oval. At this point the bony partition is often very thin and may be wanting. Hence it follows that as a result of chronic processes, especially those involving destruction of tissue, the facial nerve can be injured as a result of pressure or by involvement of its neurilemma in the pathological process. This is the more likely to be the case if the process has lasted some time, though it may occur in connection with acute troubles, otitis media catarrhalis or suppurative. Panzer has shown a preparation from a case of acute tympanitis in a child where the facial canal showed a defect and the perineurium and nerve fibers were affected by inflammation. This shows how facial paralysis may arise in children from acute tympanitis.

Politzer regards transitory facial paralysis more common than has been supposed. It has been observed in simple, non-perforative catarrh by Wilde, von Tröltsch, Politzer and others. Weiss has reported a case of perforation of the membrana tympani with a knitting-needle, which was followed by facial paralysis. Cartaz reports a case of paralysis from pressure in connection with acute otitis, cured after paracentesis, and another case occurring in connection with the acute earache and influenza. Forty-eight hours after this began facial paralysis supervened. Although all the ear symptoms subsided, the facial paralysis was very rebellious, requiring a long course of electricity before final recovery.

In most cases of facial paralysis coming on in the course of an ear trouble an old suppuration is probably at fault. Bezold observed this in 1 per cent. of all o. m. p. cases. This has usually lasted some time and is accompanied by evidences of caries and probably granulation formation, as in the following: Female child of 6 years old, with running ears and one-sided facial paralysis, which was said to be of recent origin. Both middle ear cavities were filled with granulation tissue. This was removed with sharp curette and the facial paralysis improved, but did not entirely disappear during time child was under observation. I think the paralysis due to pressure on the nerve, the facial canal being laid bare at some point, or else involved in the chronic carious process affecting the rest of the middle ear.

Intra-tympanic operations, ossiculectomy and curettage have been growing popular of late years as a cure for old, foul suppuratives. In operations of this class the close contiguity of the facial nerve and the possibility of its sheath being injured must be

borne in mind. Curetting, and all other maneuvers in the region of the foramen ovale, must be most carefully done, and the face watched constantly for twitching. I was reminded of this more forcibly than pleasantly some two years ago. I had operated on an old, long-standing suppurative, which I had labored a year or so to heal. Under ether I removed the remnant of malleus, incus and stapes, and as there was considerable granulation tissue I mildly curetted the inner surface of the tympanic cavity. No force was used at any time, and the operation was done under good illumination. I had not noted any particular twitching during the operation, nor was I expecting any; in fact, I do not recall having considered it as a possible complication. My surprise was, therefore, great to find the next morning that the face was drawn to one side and all the evidence of a very decided facial paralysis at hand. The patient laid the stiffness of the face, as he called it, to the ether, but I knew otherwise. The tympanic wound healed promptly, with entire cessation of discharge, but the facial paralysis persisted for months in spite of the regular systematic use of faradism, galvanism, iodides and tonics; and even now, two years and more after, the recovery is not complete and he laughs somewhat one-sided and cannot whistle. Of all the medical agents, galvanism did this case the most good. Here the sheath, and, perhaps, some of the filaments, were undoubtedly injured by the curette.

Bishop has had a somewhat similar case in which, after an operation for excision of the ossicles through the meatus, paralysis affecting all the branches of the facial took place. Recovery took place after use of galvanic and faradic current for three or four months.

In chronic suppuration where ossiculectomy is done, Burnett advises against the use of the curette even for the removal of granulation tissue. He reports 113 intra-tympanic operations without facial paralysis, in none of which the curette was used.

While I am not prepared to say, as does Burnett, that the sharp curette ought never be used for the removal of granulation tissue in the tympanic cavity, it ought certainly to be used with care, and with a due appreciation of the possibility of injuring the nerve. Whenever the dull wire curette will answer, it is preferable. It is also possible under certain circumstances to injure the nerve with the incus hook.

Even the use of the probe in these cases has its danger, though I do not know that paralysis has resulted. Strong medici-

nal measures used for the healing of suppurative and carious conditions may do some damage to, or excite some inflammation of the facial where there is any gap in the canal wall. There seems at present to be no way of accurate diagnosis as to the presence or absence of any gap.

Paralysis is common from pressure on the nerve at its outlet, due to purulent accumulations which break through the mastoid or Glaserian fissure, or through the thin mastoid cortex of children. Such a case has recently come under my observation, where a child, during convalescence from scarlet fever developed an acute mastoiditis, with cerebral symptoms, and later acute meningitis. The pus worked its way to the surface in the neck near the facial nerve outlet before I saw the child, and produced a complete facial paralysis of that side of the face. After the evacuation of the pus and operation on the mastoid the paralysis rapidly disappeared, although no treatment whatever was directed to the nerve as such, the child being too sick from the cerebral and mastoid condition. By the time these were recovered from, the facial had fully regained its normal condition.

In the various operations which are done for the relief of acute and chronic mastoid inflammations, cholesteatomata and the like, the facial nerve is to be borne in mind. It is probably less likely to be overlooked than in the tympanic operations to which I have already referred. Here, again, its topographical relations to the parts operated upon must be borne in mind, not forgetting that the mastoid is a borne with many variations, and that the depth of the nerve and its relations to the posterior wall of the external canal are such that in a complete operation it may be absolutely impossible to avoid its injury.

Barr states:

"Below the level of the antro-tympanic passage the facial nerve takes a curve downward and outward, and may be injured by the operator. This is undoubtedly a risk in all cases, and may be inevitable when the nerve is denuded of bone and imbedded in granulation tissue. To avoid it we must keep well up and away from the lower portion of the posterior wall of the external canal."

It was the rule when I was a student in Schwartze's clinic to measure the depth from surface downward, and the rule was given that exceptionally the facial nerve was met at a depth of 18 millimeters, that at 20 millimeters the greatest care must be observed, and 25 millimeters never exceeded. In four specimens

recently examined I found the depth to be, respectively, 16, 18, 20, 20 millimeters.

In an article on Schwartze's Clinic, published in 1895, I stated that injury to the facial in the course of mastoid operations was not uncommon, and that the nerve was affected "not only in that portion of the Fallopian canal which is above and behind the oval window and on the lateral wall of the antrum, but also further under and outward on toward the stylo-mastoid foramen, a portion of the canal that shows in its course many variations. The paralysis may not appear until some time after the operation. It is then the result of a perineuritis extending from the point of injury, or caused by pressure from blood exudation in the canal. Whenever, during an operation, the region of the Fallopian canal or the oval window is reached the greatest care is exercised, and an assistant is told to watch for the slightest sign of spastic contraction, so as to avoid, if possible, any injury to the nerve." As an instance of the occurrence of paralysis some time after the mastoid operation, I have the following to report:

Miss S., aged 16 years, old purulent ear, with fever and threatening symptoms. Operation: Mastoid antrum and attic thrown into one cavity and remnants of the ossicles, with granulation tissue and cholesteatomatous material removed and bony parts curetted. The whole of the posterior bony canal was removed and the membranous wall slit posteriorly. Especial care was taken not to injure the facial nerve. The immediate convalescence from the operation was as speedy as could have been expected, but the final recovery was delayed somewhat owing to the slow healing and final granulation of the extensive bony area involved in the operation. There was more or less purulent discharge for some time, both through the canal and at the site of the mastoid wound. It finally healed, as I supposed, for good and the child was allowed in school, seeing me two or three times per week. One day, five months after the operation, her father brought her to me with unmistakable signs of facial paralysis. This had come on two days previously, and was growing worse. The wound looked all right, and at this time I noted nothing special out of the way. I assured the father it would come all right, and hoped it would. I took her out of school, and began the use of iodides, and strychnia, with galvanism, and later faradism every day. The paralysis gradually improved. At this time the original wound was all healed except a small fistulous tract at the upper portion of the mastoid wound. After the paralysis

had lasted about two weeks I found some granulation tissue in the external canal, coming from what had been, previous to operation, the region of the attic. Removal of this seemed to hasten very rapidly the restoration of the power of the nerve. The paralysis was at no time absolute, and the cervico-temporal group recovered ahead of the cervico-facial ones. It was due to the too early closure of the external wound and consequent pressure from retained granulation products before complete healing had taken place in the deeper parts, combined with the fact that there must have been, as a result of the old caries, some point where the Fallopian canal was bare. I have wondered why this did not occur in the earlier days when the amount of secretion was greater and the pressure of dressings and retained secretions would have favored pressure on the nerve. After the reopening of the wound the healing was speedy and no return of the paralysis has recurred, although several months have since elapsed.

In all operations where the attic and antrum are thrown into one cavity and the margo-tympanicus, with it may be more or less of the posterior bony wall cut away, the Fallopian eminence must be carefully watched and its injury avoided, for underneath this lies the nerve.

Occurring independently of any operative procedure it may be necessary to determine the exact seat of the lesion. This is not usually difficult, though, of course, it may be. The history of the case will usually be sufficient. As an aid to this, Ross gives the following as diagnostic points:

If the injury is external to the Fallopian canal, the muscles of the face are alone paralyzed.

If, in the Fallopian canal, but below the point at which the chorda tympani leaves the facial, the muscles of the external ear are paralyzed in addition to those of the face.

If between the point where the chorda is given off and nerve of the stapedius there is in addition to preceding, abolition of taste on the lateral half of the anterior two-thirds of the tongue and diminution of the salivary secretion on the affected side.

If between the point of origin of the stepedius nerve and geniculate ganglion the same symptoms are present, together with abnormal acuteness of hearing.

If the geniculate ganglion is diseased all the preceding are present, together with paralysis of the soft palate and distortion of the uvula.

If above the geniculate ganglion all the preceding are present

except disorders of taste, together with implication of the auditory nerve and dulness of hearing on the affected side.

If in the pons, on a level with the facial, one or more of the following: Hemiplegia of the opposite side, paralysis of the sixth, auditory and branches of the fifth on the same side, and a staggering gait, with tendency to fall towards the side affected with facial paralysis.

The question of prognosis is one of the important ones in connection with facial paralysis. Will it get well? How long will it last? are questions sure to be asked over and over again. Fortunately most cases do sooner or later get well, usually completely so, but not always. Occurring as a result of congestive processes, or from pressure, or inflammatory products, it will pass off in reasonable time provided the pressure is removed. Even here some time may elapse before complete restoration of function takes place. I do not think that we can be certain of complete and be likely to continue unimproved. M. Furet has as contraction, or atrophy of the nerve, or thickening of its neurilemma may take place. Politzer remarks that "occurring in connection with suppurative ear trouble it must always be regarded as a grave affection and significant as indicating a possible unfavorable extension of the disease toward brain abscess or sinus thrombosis." Should the lesion result in actual destruction of the nerve trunk, the paralysis would appear suddenly, be complete and be likely to continue unimproved. M. Furet has sutured peripheral end of facial to trapezius. Some tonicity seemed to return, but the results were not brilliant. The prognosis in connection with the operative cases depends, of course, entirely on how much the nerve is injured. If only the sheath has been injured the chances of eventual recovery are good. The reaction to the electric current is a valuable prognostic sign. "At first the irritability for both galvanic and faradic currents is diminished. In a week or two the galvanic is heightened while the faradic remains diminished. As case goes on the neuroelectric effect becomes less while the myoelectric effect becomes greater." If there is no response to faradic stimulation the paralysis may be looked upon as serious. All the fibers will not be found to be affected alike, some muscles will act much better than others and tone will come back faster to some groups than others. It has been my experience that the conditions are more troublesome to the patient when there is inability to close the eyes than when the mouth group are principally affected. The inability to

close the eye produces a conjunctivitis and a degree of discomfort which is very great. As a rule I have found, fortunately, that this group were the first to regain their normal condition. It will occasionally happen that single branches remain permanently affected.

The treatment of these facial paralyses will depend primarily on their cause. If due to pressure or caries, so far as possible, the cause is to be removed. After the pressure is removed the remedies that seem to do the most good are the two forms of electricity combined with strychnia and the iodides. Of them all I regard the electric treatment as the most useful. Contrary to the experience of some, I have found galvanism to do the most for me, although I frequently use both currents in the same case. Where possible, I have the patient use a faradic battery several times daily at home, while I use the galvanic current myself. As faradism excites muscular contractility and galvanism acts directly upon the nerve endings, the advantage of using both currents is readily seen. The reaction of degeneration is not always a hopeless indication.

The question of mastoid operation will come up in many cases and must be decided according to the indications in the individual case. Urbantschitch regards facial paralysis as an indication for mastoid operation only when there is evidence that the mastoid is diseased.

The treatment is to be kept up for a long time if necessary, nor are we to become discouraged if at first the results of treatment are but slight. If the electrical reactions can be kept up and the nutrition of the individual muscles maintained at par or near to it, the chances of recovery, or at least of great improvement, are fair. Never say when recovery will take place. Say that it is probable that it will take place, but just when no one can tell. Even the cases that do not get completely well usually improve to a considerable extent; enough to justify all that is done in the way of treatment, since even a little improvement is worth a great deal to the individual concerned.

As a matter of precaution and of protection to the physician, it is wise in all operations in which there is any possibility that the facial nerve may be injured so to state to the patient or his friends in advance of the operation.

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DISCUSSION.

Dr. Chas. W. Richardson, Washington: Mr. President:—I think this is a timely and a good paper. When I received my program I was happy to see this paper on the list, because I knew it would be a good one, being from the hand of Dr. Richards. These cases of facial paralysis occur to us occasionally, both in non-operative cases and in operative cases, and they are very unpleasant experiences, as the Doctor has said, to the non-metropolitan doctor. We men who live in small towns become known and our unfortunate cases are a bad advertisement and annoying. I wish particularly to refer to the facial paralyses that occur as the result of acute and subacute inflammatory action in the middle ear cavity. I have had one such case during the past winter that for a few weeks gave me considerable annoyance. I have had under my care two patients who had facial paralyses as the result of acute catarrhal otitis media, not occurring when under my charge but occurring some years ago, in which the facial paralysis is permanent and produces great distortion of the face. My case was in a woman, and when this occurs in a woman it is still more unfortunate for us. This woman had an acute otitis media and came to me after being about ten days in the hands of a good general practitioner. There was no evidences of facial paralysis when I first saw her. I treated her several times and then there was a lapse of a week in treatments when she came to me in a great hurry one day and I used the Eustachian catheter without cocainizing the nasal cavity as I had on the two previous treatments.

The nasal cavity was a little sensitive to the use of the catheter. Two days afterwards she telephoned me that she couldn't come to my office because the right side of her face was a little deformed. She was very anxious about it and asked me to come to see her. I knew what had occurred and was very much perturbed. I saw her and found a slight facial paralysis. Two days later I saw her again and the paralysis was quite marked. I saw no more of her. Two weeks afterwards her family physician telephoned me that this woman had been to him and questioned him very carefully as to my relationship to this paralysis and told him that she had consulted one of the best legal advisers in Washington with the intention of entering a suit for malpractice. The case was under this physician's charge and he of course defended me. I knew the legal advisor, in fact he was a patient of mine, and I made a bold front and begged him to enter suit, for I wished such a case would come up so that the laity would understand the irresponsibility of the aurist in such cases. Nevertheless, gentlemen, it is very unpleasant for a man in a small town to have a lady of good social standing going around with facial paralysis and threatening a suit for malpractice, even if you are in no way responsible for the injury done. This woman still has her facial paralysis and a very unpleasant deformity. She has consulted several authorities and they have all cleared my skirts; they are good friends. Nevertheless, gentlemen, all attention should be paid to this condition and the laity should in some way be made acquainted with the possibility of its occurrence. These cases occurring occasionally in any one's practice may give rise to considerable uneasiness. I would like to call attention to the case I mentioned. Two of them are permanent and one of them still exists after about four months.

Dr. Wendell C. Phillips, New York: Mr. President:— I think Dr. Richardson has called attention to one very important phase of this question, and I would like to emphasize it and one other point. It so happens that during the past two years there has been at least one case at the Manhattan Eye and Ear Hospital, New York City, where a facial paralysis was caused by operation, which is complete and permanent, and it is only the personal influence of one of the surgeons of that institution which has prevented a suit being brought against the institution for damages. In our papers and discussions we sometimes lose sight of the fact that there is occasionally a case of permanent facial paralysis, and I would like to ask Dr. Dench whether he has ever had such a case. I have certainly seen one of them, although it did not occur in my own practice. But we do occasionally have permanent facial paralysis as the result of operative interference. The seriousness of such a case cannot be over-estimated. This very valuable paper has been timely; it has come at a time when we ought to discuss it thoroughly. And I think the criticism by Dr. Richards of the textbooks is timely as well, for they pay too little attention to the

subject as a whole and are inclined to belittle the condition and the length of time it takes to cure these cases of paralysis. Some cases get well rapidly but others do not get well under any treatment. We often find but little effect from medical treatment or treatment with electricity. I think these two points are important and timely.

Dr. E. B. DENCH, New York City: Mr. President:—A case of facial paralysis is certainly very interesting when it occurs after an operation of this kind, and it is also interesting when it occurs after acute otitis media. I think one of the most unpleasant facial paralyses I ever saw occurred after a double catarrhal otitis media. It was similar to the case the Doctor spoke of. The man came to me but he had much less pain. Everything went on for three or four days. Of course I warned him that if he had pain at any time he should let me know so that I could act promptly. One day he came into my office with his face askew and with a very profuse discharge from the right auditory meatus. I asked him why he didn't send for me. He said "I didn't know anything about it; I woke up, felt a little restless, put my hand to my ear and found this discharge. For some reason my cheek gets in between my teeth and bothers me." So no difference what you do you may get a facial paralysis. These cases usually recover in my hands if promptly treated. In Dr. Richardson's case I have no doubt the patient will get perfectly well. Of course if they run around from one man to another and in the meantime the case is neglected, the muscles suffer from lack of nutrition, become atrophied, and then you have to build up the muscles again. But if you treat the case from the start I believe it will get well. This man made a perfect recovery and I have several other cases that have recovered. All the cases, in fact, that I have seen have recovered under the use of the electric current; some have gone a little over the period of five weeks but the majority have not. Now I think Dr. Richards made a slight error when he stated that faradism and galvanism should be used together. If we have a good nerve we can use faradism, stimulate the nerve and get a reaction to the muscles. But if the nerve has been seriously injured we must use galvanism and if we have any muscle left alive we will get a reaction in the muscle. You can keep up the nutrition of the muscles until the perineuritis or neuritis or whatever you please to call it, passes off, and then the nerve has a perfectly good muscle to work on.

There are one or two other bones I would like to pick with Dr. Richards. One is that you should use only the dull curette in the tympanic cavity. I think curettement there is important. The dull wire curette would not do anything. I am speaking now from personal experience, and I think a sharp curette can be introduced into the tympanic vault, and into the atrium tympani, exactly the same as in the mastoid operation, provided you know where you are going. Dr. Richards would know where he was going, and I hope I know where I am going in these operations.

The reason we get facial paralysis is because, in a good many cases we use blunt instruments. That causes a lot of trouble, simply because a gentleman insists upon carrying a dull instrument into the tympanic vault and prodding around there for the incus. The incus does not lie close to the internal tympanic wall, but on a little shelf which forms the floor of the vault. You are as apt to injure the patient with a laryngoscope as with the curette. I invariably use a sharp curette to curette the vault of the middle ear. I am even so daring and rabid as to have cutting forceps to cut away the floor of the tympanic vault. In one case I had facial paralysis. You have to remember there, not to push the instrument too far in, but simply to hook the edge of the forceps under the outer wall. If the facial canal has been destroyed by disease or if there are anatomical peculiarities present, it may be impossible for the surgeon to prevent facial paralysis. Cases come on sometimes in acute otitis and as in some cases I have mentioned, it may occur when no operation is done. If I had operated upon the case I mentioned, in which there was facial paralysis, I would have unjustly blamed myself. But then it occurred also when I did operate. We have only to remember the relation of the oval window to the Fallopian canal. It is wise to have the patient as little under the anesthetic as necessary, that is not to have the anesthesia too profound while we are doing that part of the operation, and then any irritation of the nerve will at once be recognized by the twitching of the facial muscles.

Dr. H. H. Curtis, New York: I would like to ask if any use was made of static electricity in these cases. I have had one case of facial paralysis recover very quickly under its use.

Dr. Dench: I would like to answer a question that has been asked and say that I have never had a permanent case under my care.

Dr. James F. McKernon, New York: Mr. President:—In this operation there is one point I think the patient should have knowledge of prior to operation. When we are going to operate by the mastoid incision or through the canal upon the tympanum, we should tell the patient the possibility of having some facial disturbance following, that it is possible, although we do not expect it. That is a point that should be brought out before the operation. I have been in the habit of doing this and I have certainly in two instances in the past year felt better for having done it, because there was temporary facial disturbance following the operation. In the treatment I have tried galvanism and faradism and the use of strychnia and tonics. I decided to try massage, and in two cases my patients received daily massage. One case has almost entirely cleared up in five weeks. In another case, where the facial paralysis appeared almost before the patient was out from under the anesthetic, the paralysis did not come under treatment so readily, but after persistent massage for four weeks the paralysis was diminished and finally at the end of

eleven weeks it has disappeared. The nerve reactions in both cases were taken from time to time and there was a steady improvement. Dr. Richards has mentioned the fact that recovery, where the nerve is injured, very rarely takes place after the fifth or sixth week.

Dr. RICHARDS: No; I did not.

Dr. MCKERNON: I beg pardon; I thought you did. I was just going to relate a case I operated upon where the nerve was injured and marked facial disturbance followed. Under the persistent use of faradism, tonics, strychnia and arsenate of iron, and massage after the fourth week, there was no improvement whatever for four months; at the end of the fifth month there was gradual improvement, and although the case did not clear up entirely, at the end of the eighth month the condition was markedly improved. There is also a point in the treatment of these cases that has been brought to my attention by a neurologist, that is the administration two or three days after the operation of small and repeated doses of calomel, which he said, in his experience, is one of the best methods to help relieve the congestion of the parts, particularly if there has been any injury to the sheath of the nerve. In one of my cases I followed two suggestions and whether it had any marked effect in securing the happy result that followed I do not know, but I subsequently used faradism and strychnia and at the end of the sixth week the paralysis was all gone.

Dr. ROBERT C. MYLES, New York: Mr. President:—For a long time I contended that a practical anatomist could perform a radical operation upon the mastoid cells and attic without injuring the facial nerve. Upon attempting it in something over two hundred mastoids in the anatomy room, notwithstanding rather deliberate chiseling, I exposed the nerve sheath in a few instances, on account of the irregularity of the topographical anatomy. It is sometimes very deceiving, the mastoid antrum is so high up and the nerve is so much more superficial in one case than in another. I adopted the plan of the spiral or corkscrew method of chiseling from the mastoid cells, through the antrum into the attic; by this procedure I was enabled to remove the superior portion of the annulus tympanicus, and adjoining upper osseous wall of external auditory canal prior to attacking the floor of the aditus. But in a few instances the canal of the nerve was exposed on account of the conditions I have just mentioned. Lately I have had two cases of facial paralysis. One was a case of epithelioma of the middle ear. I saw the patient for the first time the day before the operation, she had suffered intensely and it was evident that the area of disease was extensive. The growths had destroyed the bony parts over the lateral sinus. After curetting the dura it was observed that the tumor extended beneath the styloid process, and that the bone around the canal of the nerve had become necrotic and degenerated. Yet the nerve was alive and intact. In trying to remove the diseased tissue and bone

the nerve was evidently injured. The growth extended so deeply in the tissues of the neck that I abandoned further procedures. The patient recovered from the operation in a favorable manner, but a most distressing facial paralysis was one of the results, and she ultimately died from an extension of the malignant growth.

About ten days ago a child was brought to me in the Nose, Throat and Ear Department of the New Amsterdam Hospital. It was about two years old and had fallen from a bed upon its nose. The nose was smashed in, and the face presented evidence of paralysis of the left facial nerve. The eye on the side of the injury could not be closed tightly. The case is now under observation. Of course it may be due to disturbance of the circulation or to fracture.

Dr. Howard S. Straight, Cleveland: Mr. President:—I have seen one case of permanent facial paralysis following the mastoid operation, the only case of the kind I have ever seen. The patient lives in one of the smaller towns near Cleveland, was about five years old when I saw the case in consultation. The child had a mastoid operation and following a facial paralysis. I saw the case eighteen months after the operation.

Dr. Edward Fridenburg, New York: Mr. President:—In the published descriptions of the operation by Stacke and the men who have modified it, special stress is always laid on the danger of injuring the facial nerve and methods are detailed to avoid it. In a certain percentage of cases, however, injury of the nerve must be inevitable, if you want to bring about a radical cure of very extensive caries of the temporal bone. Sometimes these conditions endanger life and the facial deformity is one of the drawbacks which the physician and patient must face. I believe the Doctor's suggestion that in every case you should inform the patient of the danger he runs, is one that we will be forced to adopt. We must expect temporary facial paralysis in a certain percentage of cases, and lasting facial paralysis in a certain proportion of cases, and I do not think it proves the physician's lack of skill if this accident should happen to him. In the cases of facial paralysis occurring when there is no operation, I think the subacute and catarrhal cases give in the great majority of cases a very good prognosis, and the majority of patients do not especially mind the temporary paralysis, which has been cured after two or three months. But it should be stated publicly and insisted upon, that facial paralysis occurring after a radical operation on the mastoid is not proof of lack of skill on the part of the surgeon, and if we save the patient's life, he might well be satisfied, even if he has a wry face.

Dr. Geo. L. Richards, Fall River, Mass.: Mr. President:—I am glad Dr. Dench is here, for I said to him in Washington that I would present a paper upon this subject. We are not all as daring operators as he. I have used the sharp curette up to the present time and I was afraid possibly I was going too far when I

read an article by a very prominent otologist in which 113 operations were done without a sharp curette and the gentleman had never had a facial paralysis. I thought it better to err on that side, although I have heretofore used a sharp curette. I do not know that I am prepared to argue upon the theoretical side of the use of electricity, but whether it is theoretically correct or not, my cases seem to have done better under both galvanism and faradism, than under either alone, possibly something in the same way as many improve under a shotgun prescription. I would keep up the electricity as long as there is any improvement, and use it twice a day when possible. But I think if we had continued the discussion long enough, we would have found that every Fellow here would have reported a case of facial paralysis in his own practice, and they would not all have gotten well in five weeks, either.

PAPER:

THE USE OF GELATO-GLYCERINE BOUGIES IN THE TREATMENT OF EARACHE.

BY GEORGE L. RICHARDS, M.D.

In an article on "Earache," published in the *Boston Medical and Surgical Journal* of July 28, 1898, I stated that I had been using for some time gelato-glycerine aural bougies, in which were incorporated various anodynes, for the relief of the early stages of earache from whatever causes.

Further experience with these has convinced me more than ever of their value, especially in an early stage of acute otitis media and in acute otitis externa. They can be inserted in the ear without difficulty, by simply washing off the lycopodium powder with which they are covered; they are then very slippery and with the affected ear uppermost easily slip down into the canal. Here the bougie soon dissolves, the anodyne is brought directly into contact with the inflamed surfaces and the pain is relieved. Besides being a medium for the exhibition of other remedies the glycerine is of itself distinctly curative, in that it tends to draw out some serum from within and lessen the tension. This favors absorption, and a paracentesis may be prevented. After insertion the ear should be stoppered with absorbent cotton or gauze and a lightly filled hot-water bottle placed at the side of, or over, the ear. Cases which have gone beyond an early stage are, of course, beyond relief with this remedy and demand treatment appropriate

to the condition, whether paracentesis or otherwise. Many a case of acute earache in children will, if promptly treated in this manner, at once subside without going on to severe inflammation.

So far as I am concerned, there is nothing new or original in this except that I have slightly modified the formula of Woods' by the addition of the carbolic acid, and after some considerable experimentation have got the proportions of the gelato-glycerine media so that any apothecary can prepare them. These aural bougies were first originated by Professor Gruber of Vienna, are familiar to those physicians who have been students of his. He, however, neither in his book on diseases of the ear nor in his division of the Vienna formulary, as given in Landesmann's *Die Therapie an den Wiener Kliniken,* ever told how they could be made, and physicians who have obtained them in Vienna have not been able to get their apothecaries to make them up afterwards in this country, in a satisfactory manner.

In Landesmann's book it is simply stated that they can be obtained in Grohs, the apothecary, Währingerstrasse, Vienna. The translator of Gruber's book says that Messrs. Bullock of Hanover Square, London, also make them, but no working formula is supplied. In the *Journal of Laryngology,* January, 1898, R. H. Woods of Dublin gives a formula, which I regard as superior to any of those of Gruber. Each of Woods' bougies contains three-sevenths of a grain of liquid extract of opium, one-fourteenth of a grain of cocaine, and one-fourteenth of a grain of atropia in gelato-glycerine. To this I have added three per cent. of carbolic acid for its anesthetic and antiseptic properties. Woods does not give in his article the proportions of gelatin and glycerine, but says they should be such that while remaining fluid at the ordinary temperature of the air the bougie should melt at the body temperature or a little before, thus ensuring their ready dissolution when placed in the ear.

I offer in the formula that follows a correct working formula, and one that any pharmacist with a proper mould can use, so that they can be made in one place as well as another. My own druggist made them in a mould intended for urethral bougies and then divided each one into three. As this mould held just 14 urethral bougies the odd number of 42 is accounted for in the number prepared. After making they are covered with lycopodium powder and dispensed in a bottle, as they are, of course, somewhat hygroscopic.

FORMULA.

Acid carbolic	minims	7
Fl. ext. opium	minims	6
Cocaine	grains	3
Atropine sulph	grains	3
Aquæ	minims	52
Gelatine	grains	18
Glycerine	grains	158

To make 42 bougies.

In size they should be no larger than will readily slip into the external canal. The size as made in a urethral bougie mould has proven satisfactory. Woods reports his results with these bougies in the ear complications of the exanthemata as very good and thinks many cases were saved the necessity of a paracentesis. This latter he is anxious to avoid where possible on account of the danger of the entrance of micro-organisms from without, and the conversion of a serous into a purulent otitis.

Whenever paracentesis is indicated it should be performed. There is, however, no doubt that if used early enough these bougies will save many a case from the necessity of paracentesis.

PAPER:

REFLEX COUGH.

BY GEORGE L. RICHARDS, M.D.

Like the poor, the cough is always with us. The infant of a day old coughs, as does the aged person whose life is almost run. Its varieties are many, its causes as various. Confronted as we are during our whole life history as physicians with this phenomenon, it might be thought that its diagnosis and treatment would have become one of the certainties of medicine. Alas, there are no certainties of medicine! So the patient who has tried various remedies at the hands of many physicians, and whose respiratory tract has been many times examined without finding the cause of the cough, is, perhaps, as a last resort, sent to the nose and throat specialist in the hope that perhaps these organs will reveal the hidden cause of the cough. His history is taken, and the

examination is made, beginning at the nose and ending at the lungs. Often one is rewarded by finding in the upper air tract sufficient that is pathological to account for the cough. Of almost daily occurrence is the cough of nasal origin, from enlarged turbinates, a deviated septum, a spur pressing on the turbinates, or a general hypertrophic condition of all the erectile structures; the cough from an elongated uvula, the cough of granular pharyngitis, the cough from hypertrophy of the pharyngeal and lingual tonsil (this latter one of the most frequent causes of tickling, teasing cough), and the cough of laryngeal origin. These are the cases in which results are frequently brilliant, and the cough of weeks, months, or even years quickly disappears; the patients sing our praises and help increase our practice.

There are many patients, however, for whose cough, after careful examination of the respiratory tract, no cause has been found; these are the coughs properly termed reflex, as no demonstrable lesion is found in the air tract from nose to terminal air vesicles. The term reflex cough includes all coughs extra-respiratory in origin, which are due directly or indirectly to irritation of the fibers of the pneumogastric nerve, whether peripheral or central. The term nervous cough is often applied to the coughs of central origin. Included in the term reflex are the coughs of pressure origin, as from aneurism, enlarged thyroid, and new growths outside of the larynx and trachea. Cough of nasal origin is in a sense not reflex, since the nose is a part of the respiratory tract, yet as it is not supplied by the pneumogastric, but communicates with it through the vasodilator nerves from the superior cervical ganglion *via* the spheno-palatine ganglion of the sympathetic, it seems to me proper to call nasal coughs reflex within the meaning of my definition.

I except coughs resulting from the irritation of mouth breathing consequent upon nasal and nasopharyngeal obstruction, since they are hardly to be classed as true reflexes. The whole subject of reflexes is still imperfectly understood, and theory seems more prominent than fact in our explanations of their occurrence. They seem as a rule due to peripheral irritation, though of central origin as well. The irritation passes along sensory fibres to the point of explosion in regions supplied by some other nerve, and when there is no direct communication travels *via* the sympathetic or some other ganglia. This accounts for the distant nature of some of the cough-producing reflexes. These reflexes have been known for many years, as Müller in his "Physiology" of 1843

wrote that irritation of any mucous membrane in the body could give rise to a respiratory reflex. In later years the whole subject has been studied with more care, and J. N. Mackenzie, Hack, Semon, and Yearsley, and others have written upon it. It is at once evident that the pneumogastric nerve, with its wide distribution to vital organs and centers which it controls directly or indirectly, is the key-note of the subject and explains how manifold are the possible causes of reflex cough.

Superficially the pneumogastric nerve arises by eight or ten filaments from the lateral tract immediately behind the olivary body and below the glosso-pharyngeal; deeply it may be traced through the fasciculi of the medulla to terminate in a gray nucleus near the floor of the fourth ventricle. Its first branch, the auricular, arises from the ganglion of the root, receives a connecting filament from the petrous ganglion of the glosso-pharyngeal, passes through a narrow canal in the substance of the temporal bone, crossing on its way to the Fallopian aqueduct, and is connected with the facial by ascending and descending branches. Emerging from the bone in the interval between the mastoid process and the external auditory canal, it ends by supplying the integument on the posterior surface of the ear. In connection with the great auricular with which it communicates, and the auriculo-temporal, it supplies the meatus, external canal, and integument of the ear. The pharyngeal branches supply the mucous membrane of the pharynx, communicating pharyngeal plexus of the sympathetic and with the glosso-pharyngeal. The superior laryngeal branch is the nerve of sensation of the larynx, with motor fibers to the crico-thyroid muscle. It supplies the mucous membrane of the interior of the larynx, base of the tongue, and ary-epiglottic fold, and communicates with the spinal accessory. The recurrent nerve supplies the other muscles of the larynx, has esophageal, tracheal, and cardiac branches, and cardiac filaments communicating with the sympathetic. On account of the variation in its origin on the two sides and its relations to great vessels, the recurrent is especially liable to reflex disturbances and pressure symptoms. There are anterior and posterior pulmonary, cervical, and thoracic cardiac branches, forming plexuses and communicating with the third and fourth sympathetic ganglia. The esophageal branches form plexuses with the pulmonary, while the gastric branches, the terminal ones, communicate with the sympathetic and with the hepatic plexus (condensed from Gray).

The phenomenon which we call cough is due to forcible expiration against a closed glottis. When a person prepares to cough not only are the vocal cords approximated but the margins of the ventricles of Morgagni are brought forcibly together, the whole forming a barrier to the exit of air until they are separated by the upward draught from the trachea. Any secretion which is readily detachable is at the same time brought up into the mouth and expelled. The cough is due to an irritation at some point which sets in motion through its afferent sensory fibers the explosive mechanism of the pneumogastric. This irritant may be in the respiratory tract or without, acting reflexly by irritation of the pneumogastric fibers.

The diagnostic points as to reflex and nervous cough should be pretty clearly in mind, since we are never forgiven for calling a cough reflex or nervous if it is afterward proven to have been otherwise. An absolute line of demarcation between organic respiratory and reflex coughs impossible, since a cough which today might be labelled reflex may later be found to have its seat in the respiratory tract; the physical signs at the time of examination not having been sufficient for diagnosis. In the larynx small undiscovered ulcerations may produce a cough simulating nervous cough. The cough irritant is referred below the larynx, and pressure at this point will excite coughing when laryngoscopic examination shows no apparent change from normal. It is entirely possible to have reflex cough engrafted on to real pathological conditions, or to have healed conditions eventuate in a reflex cough. Schrötter cites an instance in which there was a small laryngeal neoplasm; before removal there was no cough, after removal and complete healing a persistent cough appeared. Competent laryngologists could not find the site of the removed tumor, yet the cough persisted and was referred to the larynx.

Reflex and nervous cough is characterized by some or all of the following: Sudden appearance; rhythmical character; free intervals when no sign of cough are present; expectoration absent or slight in amount; no fever or marked constitutional disturbance; may continue for years or stop at any time, or eventuate in other symptoms; may come at regular intervals; stops when person's attention is fully occupied; is most marked when the patient is under observation; if stopped for a time begins with an explosion; is usually absent at night, always if purely nervous; absence of physical signs in respiratory tract; cough apparently a

useless one, does not accomplish anything; patient complains of usual symptoms of catarrhal cough in the respiratory tract; its tone is various, sometimes hacking, bellowing, shrill, croupy, metallic, at other times hoarse from insufficient cord tension. This latter is an imperfect cough, and according to Professor Gardner is somewhat distinctive of thoracic tumors or aneurism pressing upon the recurrent laryngeal nerve. Its chief features are hoarseness and imperfect explosion; it is a noisy, not infrequently harsh, brassy cough.

With all the foregoing in mind, the diagnosis is frequently difficult. Especial care is to be taken that the early stage of severe affections, as neoplasms, aneurisms, and the like, be not confounded with purely nervous cough: though a reflex cough, it may be the earliest symptom of serious trouble. Newman, before the British Medical Association, July, 1898, stated that the early symptoms of aneurism or malignant disease were often referred by the patient to the throat and nowhere else.

The points from which reflex irritations eventuating in cough come are very various:

Those of central origin: While the central origin of nervous cough has never been proven, it is at least highly probable. The dorso-lateral portion of the root of the pneumogastric has been thought to be the seat of the changes giving rise to the phenomena. In this group are the coughs of laryngismus stridulus of children and adults, hysteria, chorea, tabes, epilepsy, and neurasthenia. I do not know that the average physician regards laryngismus stridulus (false croup) as a reflex phenomenon, yet such it is, and I have placed it among those of central origin. Various irritations excite the reflex. Combined with the irritation, whether of rickets, an overloaded stomach, or what not, there is always a hyperexcitability of the central nervous system. Gottstein calls it a pure neurosis, and Semon says it may arise from pressure on one recurrent, since in the child the glottis is so small that spasm of one cord may produce sufficient narrowing of the glottis to cause dyspnea. Much more frequently the cause lies in direct or reflex irritation of the cortical centers. When one reflects upon the excitable nature of the young child's nervous system, and recalls that the attack usually occurs at night, often after a day's hard play, an overfilled stomach, or something of the kind, the occurrence of attacks of laryngismus stridulus is not difficult to understand. They seem to me to be on a par with the night terrors of children.

In adults, glottic spasm is most commonly due to hysteria. An example of this is seen in the following case:

Miss M. H——, aged fifteen years, large for her age; family history somewhat neurotic; seen by me on February 10, 1897, with history of three months' cough of the following character: at intervals varying somewhat, but about once a minute, at the time I saw her, she made with expiration a peculiar sound, nearer a cough than anything else, yet hardly a cough. It sounded more like the bleating of a sheep than anything else—"na-am-ung." I was able to get a laryngoscopic examination during the paroxysm, and found the glottis almost closed, due to spasmodic contraction of the adductors rather than to paralysis of the abductors. There was no expectoration and the general health was unimpaired; control by the will was slight, and the cough never occurred during sleep. Treatment at the hands of the physician who referred her to me for examination was without avail. At the end of a year and a half the cough gradually disappeared, but hysterical manifestations still remain.

Another case probably of pure nervous cough (central origin) is the following:

D. B——, Hebrew, tailor, aged sixteen years, has a persistent hacking cough appearing at regular intervals and lasting a few seconds, one of the apparently useless coughs without physical signs, expectoration, or constitutional symptoms. Careful examination by several competent observers revealed nothing in the respiratory tract. In the left subclavian region an occasional but not at all constant bruit was heard. The cough was not that of aneurism, nor could any sign of aneurism be found; it seemed to me to be of central origin. Remedies of various kinds were used without avail. This is one of the cases which was not wholly clear. If not a neurosis, I have so far failed to find the cause. It may possibly be an anemic cough, for I imagine there is frequently some relationship between anemia and hysteria.

Ebstein relates the case of an hysterical girl in whom the slightest irritation of any kind, sensible or emotional, produced coughing of the severest intensity.

The following case is one of paroxysmal reflex cough of unusual severity.

Mrs. C. G——, wife of an army officer, somewhat neurotic in temperament, several times pregnant. When living in Baltimore some time previous to 1878, she had some kind of a benign tumor (painful, probably a fibroma or fibro-neuroma) removed

from the region of the right shoulder-blade; for some reason the removal was not complete, and considerable pain in the region of the cicatrix remained, for which morphine in considerable doses was required. She removed to Detroit, where a paroxysmal cough appeared; this came at regular intervals of four hours during the daytime, beginning early in the morning. The cough was of terrific violence and had three explosions with each attack, separated by a few seconds' interval. At this time the cicatrix was supposed to be the exciting cause by involvement of the spinal accessory and reflexly the pneumogastric. She visited the Baltimore surgeon, who wished to operate again on the shoulder, but this she declined having done. From 1878 to 1884 she was seen by many physicians in Philadelphia, Baltimore, Washington, and Buffalo, without relief. In 1884 the cough disappeared, but in 1890 it returned in full force, and early in 1891 she came under my observation. The paroxysms were then perfectly regular as to time, coming at six, ten, two, six, and ten o'clock. There was a slight prodromal stage, then the paroxysm of coughing, lasting about five minutes, loud enough to be heard half a block away, and sounding somewhat as though a lot of furniture was being broken with a loud crash; the whole followed by a period of relaxation and weakness of perhaps ten minutes' duration. She was then entirely free from cough until the four-hour interval reappeared. There was no expectoration, but slight increase in pulse and no constitutional symptoms of any account were noted. If the patient was awake in the night, the cough would sometimes occur, never when she was asleep. The four-hour interval was absolute as to time; turning the clock back and efforts to fool her in this respect were without avail. Finding that chloroform to complete anesthesia in the prodromal stage prevented the attack, and if continued for two or three consecutive times, some of the subsequent attacks failed to appear, she suggested that I give her chloroform two days before each attack. To be sure of this she paid me in advance. I gave her chloroform at the prodromal period for ten consecutive times, and the cough ceased. This was on the 10th and 11th of May, 1891. She was under my observation for two and one-half years thereafter, without return of the cough. There was an occasional spasmodic contraction of the sternomastoid muscle producing a true wryneck, for which chloroform and morphine had to be given. She wrote me a short time since that the cough had recurred once since 1891,

for a short time only. At the present time I am not aware that the old cicatrix is troubling her. This cough was a nervous one, with a cicatrix and its communication with the pneumogastric via the spinal accessory as the determiner of the reflex.

Reflex cough of uterine origin is common, and, as is well known, is often one of the early manifestations of pregnancy. Hegar records a case of reflex cough due to a retroflexed uterus, in which the cough stopped as soon as the uterus was replaced and came on again whenever the pessary was removed. Moritz Schmidt relates a case of cough apparently due to pyosalpinx.

Coughs having their point of irritation in the stomach, bladder, intestines, and liver are not infrequent. Dr. J. J. Richardson has reported a case of violent coughing from indigestion; this disappeared as the indigestion improved, only to reappear when the indigestion again became troublesome. The cough of tabes is a well-recognized one.

Ear cough is one of the rather common reflexes. It originates from pressure or irritation in the external canal. Schmidt refers to the case of a girl who had coughed for twelve years. The removal of a glass bead from the auditory canal stopped the cough. One of my patients, a medical man, has a cough whenever a speculum is introduced into the ear or the canal wiped out with a bit of cotton on a probe. Dr. Richardson instances a case of long-standing cough which ceased after removal of some disintegrated cotton and cerumen. The cotten had been introduced some years previously and forgotten. Yearsley mentions cases of cough from inpacted cerumen. Fox (quoted by Yearsley) concludes that the track of the reflex is not direct via the great auricular nerve, as has been thought, but that "the convulsion takes place in the nervous centres," and the nerves involved are the two branches of the auriculo-temporal and Jacobson's nerve. By these channels the stimulus is carried to the centers in the floor of the fourth ventricle, where the roots of the vagus and glosso-pharyngeal nerves lie in close connection. The stimulus being mistaken for laryngeal irritation, cough is the result. Stephens has recently reported in *The Lancet* eight cases of whooping-cough successfully treated by syringing the canal and painting it and the tympanum with a paint of cocaine, glycerin and mercuric chloride. This is on the theory that there is a local inflammation in the external canal and that this irritates the nerve filaments connected with the root ganglion of the vagus, thence

stimulating the laryngeal branches. This theory of whooping-cough can hardly be called proven.

The exact track of the reflex in nasal coughs is not clear, but the facts are undoubted, since treatment of the nasal conditions cures the cough. This cough is characterized by a small amount of secretion compared with the severity of the cough, and usually starts with tickling in the inter-arytenoid region, as in the following case:

Mrs. S. W——, aged twenty-eight years, had an alarming paroxysmal cough, for which a change of residence had been advised by the family physician, who thought the lungs were involved. She was subsequently seen by several physicians without relief. Finally a specialist of note suggested that the nose might be the organ at fault. Cauterization of the turbinals cured the cough, which has never returned, although seven years have since elapsed.

For the notes of the two following cases I am indebted to Dr. Stucky, of Lexington, Ky., in whose practice they occurred:

Miss A. B——, twenty-three years of age, well-nourished, intelligent, and of neurotic type; menstruated at the age of twelve; at seventeen years her health became impaired and menstruation scanty, occasionally suppressed; there was dysmenorrhea at times. These conditions lasted several years, during which time the cervix uteri was dilated, and both ovaries were removed. This cured the dysmenorrhea but did no good otherwise. She was next operated on for vesical calculi and then for hemorrhoids. During a period of twelve years she was under the care of twelve physicians, and to quote Dr. Stucky's own words, "I concluded that everything within the abdominal and pelvic cavities had been removed that could be with safety to life." At the time of the consultation she had a peculiar barking cough, like the yelp of a hound pup, which made the patient a nuisance to herself and to every one else within hearing distance. It continued during sleep, unless controlled by morphine, and was of increasing severity. She had been subject to head colds and sore nose since childhood. On examination, both inferior turbinates were found to be markedly hypertrophic from the anterior to the posterior extremity, the pharynx granular, and there was some spasm of the adductors of the larynx during phonation, with thickening of the false chords. No local treatment was at first employed, the patient being put on rest treatment on account of the marked neurasthenic element. The cough grew worse instead of better,

and coincident therewith she had an acute attack of rhinitis, for which some ten-per-cent. cocaine was prescribed for temporary use. To the surprise of every one cocaine not only relieved the nasal discomfort, but stopped the cough so long as the effect lasted. Some chromic-acid crystals were accordingly applied to the whole length of each inferior turbinate, producing immediate cessation of the cough and relief of the neurotic symptoms. In two weeks another application was made. The patient remains entirely relieved, and her general health is better at any time since childhood.

The second case was that of a woman who had been the round of abdominal, rectal, and neurological specialists. The cough was of a most obstinate and spasmodic character, worse at night with frequent strangling spells. In one of these attacks (laryngismus stridulus) her symptoms were alarming for several minutes. Chromic acid to the enlarged inferior turbinates cured the cough.

In a case of my own now under observation, touching the turbinals with a probe will invariably excite a spasm of coughing.

Examples of cough from direct pressure on laryngeal structures are common:

Mrs. H. E. B——, aged forty years, had a troublesome, irregular, teasing, hacking cough, lasting ten minutes to half an hour, waking her in the morning. Its duration was two or more years, and it was growing worse. The pulse was 120 to 130; lungs negative; thyroid gland moderately enlarged; no appreciable tracheal pressure. Treatment of the thyroid by galvanism, with proper internal treatment, reduces the size of the gland and diminishes the cough. If the treatment is intermitted the gland enlarges and the cough returns. Pressure on the pneumogastric nerve from the enlarged thyroid is the cause of the cough.

Miss G. F——, twenty-seven years old. This is a case of cough from pressure of a neoplasm. The cough was of the imperfect kind and pretty constant; at first it was thought to be of pulmonary origin. Later events proved it to be due to pressure from esophageal cancer. The cough was the earliest symptom complained of.

The question of therapeutics in these cases of reflex cough may be dismissed with a word. It depends entirely upon the diagnosis. That is the difficult and most important part. Once the diagnosis is accurately made the treatment is readily adapted to the individual case.

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PAPER:

ASTHMA AS A REFLEX MANIFESTATION FROM ABSCESS OF THE ANTRUM.

BY CHARLES W. RICHARDSON, M.D.

All rhinologists have at times interesting cases which demonstrate the peculiar and devious manner in which pathological changes within the nasal chambers and neighboring accessory cavities work out reflex disturbances in the respiratory tract and other organs. These disturbances are at times so remote, the method of their workings so difficult to trace out and their correlation so beyond comprehension that one is unable to decide whether the relief of the accessory disturbance is an effect or an incident in the treatment. In the past three years I have had under my observation two cases of antral abscess attended by marked evidence of asthma, in both of which cases the asthma

seemed to be excited in a reflex manner through the abscesses of the antrum; or in which the asthma was relieved through the evacuation of the pus within the antral cavity. I have had the index of titles of the library of the Surgeon-General's office carefully searched for papers bearing on this subject, but could find no such disturbance mentioned. As far as possible, I have had papers and treatises on antral abscess examined, for the same purpose, but to no avail. I therefore present these cases to you as describing a never before mentioned, so far as my knowledge goes, reflex cause of bronchial asthma.

Case I.—In May, 1896, I was consulted by a young woman who gave the following history: About thirteen years ago she contracted a bad cold which was attended with profuse discharge from the nose and excessive coughing. She consulted a physician in Chicago, where she was then residing, but gained no relief. During the following spring the cough abated somewhat and the discharge from the nose lessened considerably. During the summer she noticed that the discharge ceased in the left nasal cavity but still persisted in the right cavity, and, at this time, her attention was called to an offensive odor which she occasionally detected. The odor became more intense and she described it as "something terrible." She stated that she used from ten to fifteen handkerchefs daily. During the second winter all her symptoms became more intense and to those already described were added intense frontal headache and occasional paroxysms of asthma. During the succeeding three or four years the local symptoms remained the same but the asthma became more persistent, being present every night. About this time she began to lose flesh; and from the persistence of the purulent discharge, asthma and cough, began to dread the possibilities of tuberculous infection. During all this period she was under the care of various physicians, in Chicago and Washington. At the time she came under my observation, she presented the picture of a very ill woman. She was markedly emaciated, very weak, pulse 130, and with a temperature of 102°. For a month previous to consulting me she had had frequent slight chills. Her breathing was extremely labored, and sonorous, râles could be heard when sitting close to her. The breathing was extremely difficult by day as well as at night. Examination of chest revealed sibilant, sonorous and mucous râles throughout the whole area of both lungs. Examination of nasal cavities showed the right antrum of Highmore to be the seat of an abscess; probably the original condition that

had brought about all the pathological changes. The nasal cavities were fairly free, the turbinates being only moderately enlarged and permitting free nasal respiration at all times. In the mouth on the right side I found only jagged remains of the first and second molars. These old snags were removed under nitrous oxide gas by Dr. Gustavus Brown. I made a free opening into the antrum through the alveolus and evacuated the pus, some necrosed bone and granulation tissue. The breathing was immediately relieved and the patient had no recurrence of the asthma for a period of eight weeks. After four weeks of treatment the patient was discharged as cured. After a period of eight weeks from the opening of the abscess the patient returned to me with the statement that there had been a recurrence of the discharge from the nose and for two days severe paroxysms of asthma. The cavity was reopened and, after a week's treatment, allowed to close. The patient rapidly recovered her general well-being and continues perfectly well at present writing.

Case II.—This patient was a man of thirty-four years of age, a printer by occupation; was brought to my office by Dr. P. S. Roy, to ascertain the possible relation of any local morbid condition with the unusually serious asthma with which the patient was afflicted. Dr. Roy stated that the patient had had asthma for a period of two years, upon which he had exhausted his therapeutic knowledge without any benefit to the patient. During all this period the patient had a profuse, offensive nasal discharge. The poor fellow's appearance was deplorable and his exhaustion and extreme efforts to respire were pitiful to behold. I found all evidence of a left antral abscess. There were several bad teeth on left side and I requested that the second bicuspid and first molar be extracted and that he should then return to me to have abscess opened through alveolus. This patient was also in a septic condition, as demonstrated by frequent chills and high temperature. I narrated my previous case to Dr. Roy, of which he already had knowledge, and advised the treatment of the antrum, which was absolutely necessary, hoping also that it might demonstrate some causal relationship to the asthmatic condition. The patient was so exhausted by the trip to my office that it was a week before he was enabled to have the teeth extracted. The patient's breathing was so extremely embarrassed and his exhaustion so great on the day upon which he presented himself for operation that I dreaded almost to make the attempt at opening into the antrum. After perforating and washing out cavity,

I removed him to an adjoining room and continued my work. In about fifteen minutes I returned to my patient and was almost dumbfounded at the marvelous change in his breathing and the evidences of relief depicted in his countenance. In response to my inquiry as to how he felt, he replied "Bully." In a period of a month he was discharged cured, having had no recurrence of asthma since the few minutes after the evacuation of the antral cavity. Two months later while bicycling, he reclined upon the grass and contracted a serious cold. This cold caused a recurrence of the antral abscess and asthmatic paroxysms. Several weeks after this occurrence the patient presented himself again and I immediately reopened the abscess with attendance of immediate relief. This patient is still under my care. Since he returned to me in January of this year (1899) the patient has relaxed in treatment several times, each relaxation in treatment being attended with a reaccumulation of pus and attack of asthma. So long as the cavity is free from pus, so long is he free from asthma.

In the two cases above narrated it is to be noted that the complete relief of the asthma resulted from or was coincident with the evacuation of the antral cavity and so long as these cavities remained free from accumulations of pus there was no recurrence of the paroxysms of asthma. It is also noteworthy that in the first case, although three years have elapsed since the cure of the antral abscess, there has been no deviation from the absolutely normal condition. There was not nor has there been at any time during the treatment of these cases while under my care any remedy given to control the asthma. It is impossible to state whether the reflex disturbances issued from the pathological change and the accumulation of pus within the antral cavity, or from the nasal cavity due to the irritation excited by the pus which ran from the antral cavity and bathed the tissues of the nasal chambers.

DISCUSSION.

Dr. Robert C. Myles, New York: Mr. Chairman:—I unfortunately did not hear all of the paper, but I do not think there is any doubt about irritation or pressure in the antrum of Highmore, being the cause of an asthmatic condition of the bronchial tubes. You know we are indebted to Woakes of London for writing more about this than any other man, and if we eliminate certain enthusiastic assertions, he is in advance of many at the present time. In the pyemic cases we have more or less change

of the mucosa, so-called polypoid degeneration. These polypoid states create a condition of pressure which in conjunction with the absorption of the fluids bring on most distressing asthmatic attacks. I have reported a number of cases in which the antrums were found distended with polypi and purulent débris. The polyps were indented after the manner of sardines when removed from a box. After the antrum was cleared the asthma disappeared.

It has been said that the best remedy for these extreme polypoid cases is the opium pipe. I have had more than a dozen of them under my care, and contrary to the opium pipe theory, they have made brilliant recoveries, after large openings had been made through the canine fossæ and a thorough and careful curettage of the diseased tissues had been carried out. In some of the cases I made large openings through the nasal walls of the antrums, but the results were not so satisfactory.

Dr. H. W. Loeb, St. Louis: Mr. President:—I am very much interested in the paper from the standpoint of what I must consider the proof that the asthma was due to the antral trouble. I think the Doctor has shown quite positively that the symptoms having passed away with the removal of the trouble in the antrum, we must accept this as the cause of the asthma. We have all, probably, seen asthma in cases of disease of the antrum in which there were polypi in the nose. The case described is to me at least a novel condition.

Dr. J. A. Stucky, Lexington: Mr. President:—I was very much interested in Dr. Richardson's paper. I am not much surprised at the reflexes described, but what struck me was the short time in which he was able to relieve these patients, in one case four weeks and in another eight weeks. I would like the Doctor to give us an outline of the treatment pursued, whether the antrum was curetted and whether there were granulations there. I have had a good many cases of abscess of the antrum and I cannot get rid of mine in four weeks, nor in eight weeks either.

Dr. Chas. W. Richardson, Washington: Mr. President:—Dr. Stucky seems surprised that my cases got well so quickly. They didn't get well so quickly. If the Doctor had paid closer attention he would have seen that one patient is still under my care.

Dr. Stucky: I understood you to say four weeks, sir.

Dr. Richardson: In four weeks I thought he was well, but he came back with a recurrence. In the other case there was the same history and it took him some time to get well. The third case, in the woman, got well very quickly. I do not cure all my cases of antral abscess in two or three weeks; I take a year or longer, sometimes. I am not different from the rest of these gentlemen. The way I treat these cases is to open them up thoroughly, curette them, wash them out and pack them. Dr. Loeb asked me whether there was any other condition present. There was no other condition, except the chronic antrum abscess cavity.

PAPER:

"MUCOCELE" OF THE MAXILLARY SINUS.

BY W. SCHEPPEGRELL, A.M., M.D.

In reviewing the older literature on the subject on diseases of the maxillary sinus, the term "hydrops antri" is repeatedly met with, especially in works on general surgery. The title is now rarely seen, and it is generally admitted that the hydrops cannot form in the maxillary sinus on account of the character of the mucous membrane lining this cavity. The cases referred to in the former literature of this subject were probably due to other conditions, the word "hydrops" indicating an error in the diagnosis.

While the term "hydrops antri" has been abandoned, that of "mucocele" of the antrum of Highmore is occasionally met with. In Chas. Burnett's "System of Diseases of the Ear, Nose and Throat," Jos. H. Bryan,[1] while admitting that hydrops in its true sense, that is an inflammation characterized by a serous secretion, cannot develop in the maxillary sinus, he believes that mucocele, indicating an accumulation of mucus, the result of catarrhal inflammation of the mucous membrane due to extension from the nose, may still exist in cases in which the ostium maxillare becomes closed so that the accumulated mucus cannot escape.

The anatomy of the mucous membrane of this cavity, however, indicates that the term "mucocele," especially presenting the violent symptoms that are usually ascribed to this condition, cannot be considered as a pathologic entity, this being also the opinion of Zuckerkandl,[2] and the majority of investigators who have given attention to this subject.

The lining membrane of the maxillary antrum consists of two layers, the one forming the periostium of the bony wall and closely adjusted to all its anfractuosities, and the other, the mucous membrane proper. In the latter are found glands of the muciparous order, some being of acinous and others of tubular formation. These glands are very much scattered, except in the upper part of the cavity, where they are found in a somewhat larger number. On account of the paucity of these glands the maxillary sinus secretes only sufficient to moisten the surface of the cavity, this

fact having already been pointed out by Burns,[3] in 1821. There is a close adjustment between these secreting glands and the absorption by the lymphatics of this cavity, so that without the loss by evaporation from the inspired air, as in the nasal cavities, there is no excess of moisture.

A careful investigation of the cases which have been published under the title of "hydrops" and "mucocele" indicates that by far the majority of these cases were due to cysts, and even some of the reports of empyema were probably also of cystic formation. These cysts, which may be single or multiple, may be due to dilatation of a follicle in the mucous lining of the antrum, to cystic degeneration of a polypus, or to dentigerous cysts, either internal or external, which may reach the maxillary sinus by erosion and present all the characteristics of an antral cyst.

While empyema of the antrum is not of infrequent occurrence, cases exhibiting the symptoms of retention, dilatation and deformity, whether published under the term hydrops, mucocele, or cysts, are of comparatively rare occurrence. That a cyst which is ruptured into the nasal cavity may be mistaken for empyema is easy to understand, and a differential diagnosis presents so much difficulty in some cases that a mistake can easily occur. If a cyst completely fills the maxillary sinus and spontaneous rupture takes place into the nasal cavity, and pathogenic microorganisms invade its contents, we will have all the evidences of an empyema, and a correct diagnosis can be arrived at only by the most careful investigation. If the walls of the cyst are closely adherent to the sides of the antrum and an artificial opening is made through the alveolar process, the probability of correcting the error becomes greatly diminished, and no doubt some of the cases of rapid cure of a supposed empyema of long standing are due to this cause.

Cysts may be present in the antrum for an indefinite time, as they usually give rise to no marked symptoms until the distended walls begin to encroach upon the normal limits of the sinus. As already stated, the diagnosis is not always a simple matter. Transillumination, which is an important measure in empyema, is here negative as compared to the normal cavity, and the same may be said of the Roentgen rays. The thin wall of the cyst and its translucent and frequently transparent contents offer little obstruction to the luminiferous rays, so that the difference from the normal cavity is practically nil. In fact, it is not impossible that the contents of the cyst may have some converging effect on the

light, so that the transillumination is actually increased. Nor would the X-rays offer much more satisfactory results in such cases. When the cyst formation has developed to such a point that the symptoms of distention are present, the diagnosis is greatly facilitated. Ectasis may be due either to a cyst or a solid tumor, and transillumination and the X-rays easily enable us to differentiate between the two.

Cysts of the antrum have sometimes been mistaken for more serious conditions, and several cases are on record where preparations were made for the surgical removal of the whole superior maxilla under the impression that the symptoms were due to a malignant neoplasm, when the conditions presenting themselves were found to be due to a dilated cyst.

The prognosis of cyst of the maxillary sinus is better than in cases of empyema of long standing. We are all familiar with the obstinate character of many cases of empyema where the pathologic condition has existed for a considerable time. Cysts, on the other hand, frequently yield promptly to treatment, and, even in cases in which a spontaneous rupture has taken place and the secretion infected with pathogenic micro-organisms, the prognosis is much more favorable than in cases of chronic empyema of the maxilary sinus. Some of the published rapid cures of cases of long-standing empyema of this cavity were probably due to this condition.

Several cases of cyst of the maxillary sinus are reported by Kunert,[4] in which the symptoms strongly suggested empyema, but in which the real cause was a cyst of the maxillary sinus. Lesniowski[5] reports a case of a patient who had suffered for a year and a half from pain and swelling similar to that found in the cases formerly reported under the title of "hydrops" of the maxillary sinus. In this case, also, the cause was found to be a cyst of the maxillary sinus, complete relief following its extirpation. A case under the title of "mucocele" is reported by Baumgarten,[6] the patient being a boy of 13 years, in which a spherical swelling the size of an apple appeared under the left zygomatic process. The skin was normal, but weak fluctuations could be detected at the canine fossa. The hard palate was depressed on the left, and fluctuations could also be felt here. The nasal cavities were normal. Puncture through the canine fossa was followed by the discharge of serous matter. The treatment was afterwards continued by irrigation, and the patient made a complete recovery. The author believes this to be a case of muco-

cele, due to obliteration of the ostium maxillare, but the symptoms and history leave no doubt but that it was due to a cyst of the maxillary sinus.

A case of "hydrops" of the maxillary sinus in a girl of 13 years is reported by Cassalette.[7] The reading of this case also leaves little doubt but that the symptoms were due to a cyst of the maxillary sinus. Chas. H. Knight[8] reports a case of cyst of the maxillary sinus, this being of interest as it also presents the majority of the symptoms ascribed to "hydrops antri," or "mucocele." The patient, a man of 29 years, complained of no pain, the only symptom being an obvious deformity in the left malar region, the mass pushing the upper lip forward and the dilatation extending as far as the lower margin of the orbit. There was no malformation of the roof of the mouth, and the nasal fossa on the affected side was quite normal. On incising, it was found that the wall of the cyst was so firmly adherent to the bone that the lining membrane of the antrum seemed to constitute the cyst wall. About two ounces of thin, slightly turbid fluid were evacuated. A director was passed with some difficulty from the antral cavity into the nasal fossa through the ostium. No suppuration developed, and four months after the operation there had been no recurrence.

In concluding this article, I will give the clinical history of a case, which recently presented itself in my practice, of a cyst of the maxillary sinus, which also presented all the characteristic features ascribed to the old cases of "hydrops" and to the more recent cases of "mucocele" of the maxillary sinus. The patient, a man of 42 years, applied February, 1899. He complained of severe pain in the region of the left cheek and pressure on the eyeball. The pain had existed for several days, but for the past twenty-four hours had been so severe that the patient was entirely unable to sleep or lie down. The fulness of the left side of the face and throbbing were still violent when the patient was examined, although some relief could be obtained by holding the parts with his hand. Pain on pressure was very severe, and radiated over the whole area of the superior maxilla. The pain was especially localized in the region of the second bicuspid on the left upper side, the tooth having been extracted fifteen months before. When removed, this tooth was found to be diseased. Since then there had been occasional pain on the left side of the face, but not of a grave character, and there had been no swelling at any time.

The symptoms indicated pressure from the left antrum of Highmore. The transillumination test exhibited no difference in the amount of light transmitted on either side, showing that the pressure was not due to a solid tumor. Had the cavity been filled with purulent matter, as in empyema, there would probably also have been a noticeable decrease in the light on this side, although, as we know, transillumination is not always a reliable test. The case thus presented all the symptoms of the older cases of "hydrops" or "mucocele." As a result of examination, a diagnosis of cyst of the antrum was made.

The symptoms being very severe, and the patient declaring emphatically that he would be unable to stand the suffering another night, it was decided to make an exploratory puncture in the cavity without further delay. The tissues in the site of the extracted tooth having been cocainized, a small trephine was passed through the alveolar process into the cavity. This was followed by a negative result. A probe, however, being passed through the opening met with a resisting membrane. When this was punctured a viscous, non-fetid secretion was evacuated, the patient immediately expressing a sense of relief. A small cannula was then passed into the cavity, but all efforts to pass a solution through the ostium maxillare were unavailing. A light packing was placed in the opening in the alveolar process, and an appointment made for the following morning for a more radical operation. The next day the patient was anesthetized, and a large opening made in the canine fossa. The cyst membrane was then removed with a curette, but with considerable difficulty, as it was adherent in many places.

After the cavity had been thoroughly curetted, the solution was again passed through the antrum, this time finding its way through the ostium maxillare into the nasal passage. The cavity was carefully packed with five-per-cent. iodoform gauze, which was removed twenty-four hours later, when it was irrigated with a mild boracic acid solution and again packed. After this treatment was continued for three days, the irrigation only was practised, and a week later the patient was sent home with instruction to syringe the cavity with warm boracic acid solution twice daily.

A month later the patient was again seen and appeared practically well. The fistula had almost entirely closed. At no time had there been any marked fetor. Occasionally, when the cotton which closed the fistula to prevent the entrance of foreign matter

was left in position too long a slight odor developed, but disappeared with the next washing.

This case illustrates the difficulty of making a diagnosis between cyst of the antrum and the so-called "mucocele." Had the walls of the cyst been adherent at the point at which the antrum was first punctured, or had the trephine passed through the wall into the cyst cavity, the illusion that it was a mucocele, with obliteration or obstruction of the ostium maxillare, would have been very strong. Had a spontaneous opening taken place into the nasal cavity and the retained secretion infected with pathogenic micro-organisms, the differentiation between cyst and empyema would have presented the greatest difficulty.

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PAPER:

A CASE OF SARCOMA OF THE TONSIL—THREE REMOVALS, RECURRENCE AFTER EACH—DEATH FROM METASTASES IN MESENTERY AND BOWEL.

BY J. MORRISON RAY, M.D.

Sarcoma of the tonsil has been looked upon as a rare condition, this view being largely due to the statements found in the text-books of McKenzie and Bosworth. The former, under the general head of cancer of the tonsil, remarks that the disease is rare; yet later, in the same chapter, states that lymphomata, or lymphosarcoma are found as a part of a general condition. Bosworth could find in 1892 only 45 cases that he considered as having their origin in the tissues of the tonsil.

In 1895 Lamphear found 71 cases recorded. Since then it has not been uncommon to see isolated cases reported. Very few surgeons have seen more than 1 or 2 cases in a long and extensive experience.

I wish to report a case that in many respects is unique: W. H. H., aged thirty-seven years, consulted me May 7, 1898, with the following history: For two months he had noticed a small mass forming in his throat on the left side. No pain or other discomfort until the past few days, when it began to be sore and present a sense of something in the throat, and seemed to interfere with talking by the presence of a fulness. He had been in poor health for several months, had lost flesh, and said he had dyspepsia. His family history was negative. On examination, I found on the left side, hanging by a narrow pedicle from a crypt of the tonsil at its lower part, close to the anterior pillar, a mass as large as an olive, of a dark-purplish color, and roughened on its surface like a raspberry. It could be lifted by forceps, and the pedicle was well defined. There was no cervical glandular enlargement. The appearance was suggestive of papilloma, and I advised removal by means of the snare because of the apparent great vascularity.

The tonsils on both sides had undergone the normal atrophic process, and did not protrude beyond the plane of the anterior pillar. He had not been a sufferer from chronic throat trouble or recurring tonsillar inflammation.

The parts were cocainized and a cold wire snare loop was easily passed around and pushed well down on the pedicle. The growth seemed soft and yielded easily to the snare constriction. In ten minutes the mass came away. Only a little blood-stained saliva was expectorated. The mass was examined closely after removal, and macroscopically looked like an angioma, numerous small blood-vessels being seen just beneath the epithelium. No discomfort followed, and he was not seen again for three days. At that visit a small granulating mass seemed to be pouting from the tonsil crypt, but nothing was done, as it was believed that it would rapidly cicatrize.

June 20th I next saw the patient; he said the mass in his throat was growing again. On examination I found that it was returning, and was then as large as a raspberry, and resembled it very much in size, color, and conformation, attached to the tonsil by a constricted base somewhat broader than the original pedicle. This second growth was removed with Gradle's cautery snare close to the tonsil, and the depression from which it sprung was gone over thoroughly with a cautery-point, and the parts thoroughly destroyed. I saw him in two days, the throat being quite sore from the burning. Being now suspicious of the condition, I asked my friend, Dr. A. O. Pfingst, to examine the mass removed. His report is as follows:

"I take the specimen you sent me for a lymphosarcoma. It was soft to the touch, had an uneven surface covered by a smooth membrane, which in parts was thick and formed white nodules. The membrane otherwise was thin and transparent, showing the brown tissues beneath it. It was easily torn or punctured by a slight touch of a blunt instrument. On the interior the mass had a brown color. It was soft and brittle and could readily be made to bleed. Particles of the tissue, teased in glycerine, showed large, round cells, with granular protoplasm and many red blood-cells, also some fibers of connective tissue.

"The specimen was hardened in formol, sections being made through its long diameter and these stained with hematoxylin and eosin. The growth was covered externally by stratified epithelium, a light line of demarcation being visible between it and the pseudoplasm. The tumor mass was made up almost entirely of large, round cells with nuclei loosely arranged and separated by a granular intercellular substance.

"Bands of connective tissue could be seen distributed throughout the tissue, many of them carrying wide blood-vessels. Ex-

travasated blood could be seen abundantly throughout the tissue in areas of different sizes."

I saw the patient July 24, 1898. He informed me that since the last operation he had been suffering from his stomach and bowels, and had spent two weeks at a resort, the waters of which had been advised for this bowel trouble. During the last two weeks the throat tumor had again begun to show itself, and that a small lump that felt tender on pressure could be felt on the outside. I now informed him of the possibility of the serious nature of the growth, and advised its removal more thoroughly. On examination I found the recurrence was not extensive and the surrounding parts were not inflamed. For the third time the growth was removed, the cautery snare being used and the entire tonsil deep between the pillars cauterized. Four days later I saw him, the cauterized area was clearing of slough and looked well, but the glands along the margin of the sternomastoid were tender and several of them enlarged.

For the further history of the case I am indebted to Dr. James B. Bullitt. September 17, 1898, the patient was seen by Drs. Cartledge and Bullitt, with the history that two weeks before he had noticed a lump in the left side, below the ribs, about the size of a turkey egg, and movable. When seen he was suffering from evidences of acute bowel obstruction; an operation was done. The abdomen was opened in the middle line. The bowel was found obstructed by a nodular mass in the wall of the gut; intestines were much distended above. The mesenteric glands were enlarged, many being as large as a partridge egg. These enlargements in the mesentery were numerous along the vertebral column on the left side; two were removed. The patient died September 26, 1898, nine days after the operation. Microscopical examination of the mesenteric gland removed by Dr. Bullitt, showed it to be a round-celled sarcoma. The condition found at the operation was suspected, but as the symptoms of bowel obstruction were acute, the necessity of relieving this by abdominal section was urgent. The bowel was opened above the seat of obstruction, and water taken by the mouth in a short time passed through the incision, showing the opening in the small intestine to be high up.

Out of approximately 80 cases of which I can find records in the literature at my command, there are only 3 that in their local appearance and history seem to resemble the one just reported. Czerny reports a case of male, thirty-four, tumor pedunculated.

Removal, recurrence, metastasis to wall of intestines, peritoneum, and mesenteric glands. Schroeller reports a case in which it assumed a well-defined pedunculated form. Charnley, 1895, reports a case of lymphosarcoma, the size of a small orange, removed three times, with rapid recurrence; original tumor had a very narrow, restricted pedicle. Knight states that the usual form of pedunculated tumor growing from the tonsil is papillomatous, or fibromatous, usually the former. Schmidt among 32,997 cases of diseases of the upper respiratory passages found only 2 cases of sarcoma in this region.

Most of the cases that I find reported commence with enlargement of the tonsillar gland structure, and with evidences of local inflammatory action and discomfort. Lymphosarcoma, the most malignant variety, is the one most apt to be found originating in the glandular structure of the tonsil.

From the frequent and early appearance of gland enlargements in other parts of the body, especially the cervical region, it has been suggested that possibly the tonsillar condition was only a part of a general sarcomatous process, so-called Hodgkin's disease. When first noted in the tonsil metastatic deposits have been observed in the lungs, liver, intestinal walls, peritoneum, and mesenteric glands. The probability of it being a part of a general sarcomatous condition is borne out by the treatment; extirpation of lymphosarcoma, either by external incision or by the mouth, has not succeeded in prolonging life, recurrence and death taking place in from four to six months. The only cases in which recurrence has not been noticed were cases of spindle-celled growths.

PAPER:

TRAUMATIC HEMORRHAGE FROM THE NOSE AND PHARYNX, WITH REPORT OF CASES.

BY ROBERT C. MYLES, M.D.

Pain, hemorrhage and sepsis are the three chief problems that confront the rhinopharyngologist. I have selected the second as a subject for some brief remarks, with the hope that they may cause many of the members to place on record their unreported experiences, with the annoying conditions and consequences of traumatic bleeding from the nose and throat.

The writer has seen cases of severe and serious bleeding from the septum, inferior and middle turbinals, rhinopharyngeal, faucial and lingual tonsils, the external wall of the antrum of Highmore, and from benign and malignant tumors of the nose and throat. In each case the hemorrhage was arrested temporarily or permanently, in a brief space of time, by the application of pressure.

One of the most serious cases of nasal hemorrhage was in a young man, about 20 years of age, where the middle third of the inferior turbinal had been removed with a saw and snare. The patient, who lived several miles away, was disturbed on the second night after the operation by a free and continued discharge of blood from the nose. A local general practitioner was called in, who tamponed the nasal cavity, but ineffectually; he tried to introduced the post-nasal plug, but frightened the patient, and the family, who protested, and prevented him from carrying out the necessary procedures.

I was called about 4 A. M., and reached the patient within an hour. He presented one of those deplorable pictures that we usually find in cases of continued hemorrhage from the upper respiratory tract. He was as pale and white as a cadaver, very weak, and nearly pulseless, with the evidences of blood on towels, in basins, and bespattered upon the bed and floor. A thin and non-coagulated sanguinolent fluid was flowing from the nose. I removed all the packings, per-chloride and blood accumulations, and used as large a tampon of cotton and tanno-gallic acid as I could place firmly within the space between the wound and the contiguous parts of the septum, turbinals and outer wall. This ar-

rested the flow of blood at once. Part of the packing was removed within thirty hours, followed by slight oozing, and the balance in about forty hours. It was months before the patient regained his strength and color.

The severest hemorrhage from the ethmoidal and middle turbinals that the writer has ever had under his care was in a man who had been operated upon by a confrère. The hemorrhage had been persistent and profuse for several hours, and there were many of the symptoms of exsanguination. It required firm tamponage, high up between the middle turbinal and the outer wall.

The most troublesome cases that I have ever met with were those where vasicular fibroids filled the rhinopharynx and posterior nares. The author has seen an extremely profuse hemorrhage produced by an attempt to gouge out the base of a fibroid tumor from the vault of the rhinopharynx in a boy of about 17 years of age, whose external carotid arteries had been tied one week previously. In this case the hemorrhage was so persistent that it had to be tamponed for several days.

Two cases of faucial tonsillar hemorrhage are worthy of special notice. One was in the case of a young man about 25 years old, with fibrinous tonsils; bilateral tonsillotomy was performed and profuse hemorrhage commenced from the left tonsil at once and continued for about ten hours, whenever the compress was removed. The electric cautery and tanno-gallic mixture were tried and failed to diminish the bleeding. The patient gradually recovered, but suffered from the effects of the loss of blood for about one year.

The other was one of a child, age eleven. The tonsils were removed and followed by slight hemorrhage. On the fourth day after the operation she developed whooping-cough, and during one of the spasms of coughing a violent bleeding commenced from the lower part of the left tonsil, the major part of the blood being swallowed, until the stomach would reject from six to eight ounces at a time. The blood also flowed profusely from time to time from the mouth. I did not reach the case for about three hours after the onset of the hemorrhage. Several colleagues had been called, and we succeeded in arresting the hemorrhage with a tanno-gallic acid compress, held in place by the finger. The child was many weeks recovering from the ill effects of the bleeding.

In regard to hemorrhage from the lingual tonsil, only one case can be found recorded in my note-book. It was persistent and alarming; the patient bled about two hours regardless of the em-

ployment of the usual methods of arresting hemorrhage. It was finally controlled by placing the patient on a lounge, face downward, and over the side, the finger, wrapped with tanno-gallic acid compress, was placed over the base of the tongue upon the bleeding spot. This controlled the flow, and the patient had no further trouble, save from the effects of excessive loss of blood.

The important points to be considered are:

First, have we any means of finding out before operating, with any degree of accuracy, the probabilities of hemorrhage.

Second, if we have reason for suspecting excessive bleeding, should we not be more limited as to the area and depth in making the sections and incisions—for instance, should the faucial and rhinopharyngeal tonsils be removed at the same sitting, or should the nasal septum be sawed or trephined to the extent of wounding the spheno-palatine artery.

Third, after each operation where there is a reasonable possibility of delayed or secondary hemorrhage, the patient should be kept within easy reach of the surgeon or a competent assistant.

Fourth, careful instructions should be given to the attendants to watch the patient during the night. The writer has seen several cases in which dangerous and alarming hemorrhages occurred, and the conditions were not discovered until the patients were nearly exsanguinated. In one case the bed and the floor beneath the mattress were flooded with blood. The child had slept quietly and given no symptoms of ebbing, approximately, its life away.

In several other cases the blood was swallowed for hours in a clandestine manner. The collapsing state and vomiting were the first evidences to the attendants of the serious conditions.

Fifth, when we have evidence that we have to deal with a bleeder, the sooner we apply expressed tampons of tanno-gallic acid in a precise and definite manner to the bleeding points the more prompt and certain will relief be secured from the serious embarrassment of dangerous traumatic nasopharyngeal hemorrhage.

The author has succeeded in cases of children in arresting obstinate hemorrhage from the region of the faucial tonsils most effectively with the index finger, after it had been covered with a thin layer of absorbent cotton and dipped in a paste of tanno-gallic acid. In the case of an adult, an alarming flow of blood was arrested instantly by passing a ligature through the anterior and posterior pillars and the tonsillar base. The extreme cases

of rhinopharyngeal hemorrhage were arrested with sponges and cotton tampons, which had been accurately cut to fit the rhinopharyngeal space, and were changed within twenty-four to thirty-six hours.

The cases of moderately excessive hemorrhage from the faucial and lingual tonsils were arrested by slowly sipping the tannogallic mixture.

DISCUSSION.

Dr. Geo. L. Richards, Fall River, Mass.: Mr. President:— Speaking of hemophilia when the blood will flow through anything as if it were water, I had an experience this spring with a young woman, perhaps fourteen years old, as near as I recall it. She had menstruated a year or so. It was a case of simple nose bleed, so called, which had been treated by the family physician. Still the nose had continued bleeding. The blood was so thin that under the influence of fifteen volume peroxid of hydrogen there was not the usual sizzling heard under such circumstances and hardly any coagulation. I packed the nose but whenever the packing was removed the bleeding would begin again and oozing continued all the time. Having not succeeded to the satisfaction of the family, I was promptly replaced by another physician, who saw the case once or twice and managed to get a string through to the posterior nares and placed a plug. He not having succeeded promptly enough, was replaced by another, and so on until they had tried five of the best physicians in our community. This was the result of the first ten days or two weeks and then bleeding ceased for a couple of weeks, then started again, and so on, until eventually she died. During the progress of the case some spots of purpura hemorrhage appeared, but I think it could scarcely be called a true case of purpura hemorrhagica but rather a case of true hemophilia. How this hemorrhage started in the nose I do not know. Whether or not she had picked her nose, I do not know. No operative procedure had been done.

As to operating upon both faucial and adenoid tissue at the same time, it has been my custom to operate upon both at one sitting, and usually without any great difficulty from hemorrhage. When the faucial tonsil bleeds after operation and does not stop readily under pressure from the finger, I hunt for the bleeding point and catch it with a hemostat. I have not seen any reference in laryngological literature to the use of the hemostat in controlling such hemorrhage, yet I do not know that there is anything new in it. Somebody has recently written how easy it is to put on the purse-string suture for tonsillar hemorrhage. The blood is wiped off from the cut surface and the suture tied. Practically this would seem to me a difficult procedure whether the operation were done under ether or cocaine, and would require more assistance than most of us commonly have at hand. I

think in most instances one can with the hemostat, if the bleeding comes from a tonsillar artery, or its small branches, get hold of the bleeding points and twist them and the hemorrhage will stop, as I have proven practically in a number of instances. If the bleeding comes from one of the anterior pillars, and a hemostat is used, there will be some inflammatory reaction afterwards. In one case that came under my observation, the child went to bed at night after the bleeding had ceased, and the bleeding began again. The father had been told, if the bleeding returned, to put a gag in the child's mouth and apply pressure. Fortunately in that instance the bleeding was recognized, but I can easily imagine that such a hemorrhage might prove fatal even before it was recognized, unless a careful watch is kept over these patients.

Dr. KENEFICK, New York: Mr. President:—I have had one very interesting case of fatal hemorrhage. In regard to Dr. Myles' first query, as to whether we can do anything beforehand to find out definitely whether we have a case of hemophilia to deal with, I would say that my case would answer his question. I think a very thorough inquiry was made in my case. A small boy of German parentage, four years of age, was brought in and a diagnosis of adenoids was made and he was assigned to me for operation. I saw nothing unusual about the boy and there was nothing unusual about the operation. He bled what I would consider an average quantity and and he went to the ward apparently in very good condition. Fortunately the rule of the hospital is to retain all these cases in the house over night under close observation. About four o'clock the nurse noticed that the child was bleeding from the nose and mouth. The house physician was called and the bleeding was stopped to his satisfaction with peroxid of hydrogen. About nine or ten o'clock he noticed bleeding again and he then packed the nose with tano-gallic acid. The second day, after the plugging was in for 30 or 40 hours, it was removed. Every packing that was placed in the nose after that was bled through, and the child died on Friday morning. The interesting thing about it, I think, is the family history, which I found to be as follows: The first child died from hemorrhage from the nose and mouth, as described by the father, ten minutes after birth. The two remaining children were remarkable children in the neighborhood in that if they were bumped at any time in playing, a large swelling took place at the seat of the bump. This was well known to the neighbors. One of the children was under the care of an orthopedic hospital for the treatment of a large knee-joint. And this child shows remarkable discoloration on slight injury. Fortunately, that child escaped operation at the orthopedic hospital. The case shows well the importance of Dr. Myles' suggestion that careful inquiry should be made before operation. Whether an examination could be made of the blood, I do not know of any special method, but perhaps some of the gentlemen can speak of the examination of the blood by the spectroscope.

Dr. Jas. F. McKernon, New York: Mr. President:—I would like to record a case of hemorrhage from the tonsil, that occurred a few years ago in a young man sixteen years of age. The operation was immediately followed by a very alarming hemorrhage, and I can testify to the fact that it is not a pleasant experience. I tried pressure first over the base of the tonsil which had been removed, but it didn't seem to have any effect. It appeared as if the tonsillar artery were cut, as it probably was, and after the pressure was removed the hemorrhage would begin again. The patient was becoming faint, so I finally took a large uterine clamp, that covered a surface I should judge of one-half to three-fourths of an inch, and I caught up the whole substance of the base of the tonsil and closed the clamp. That stopped the hemorrhage partially, with the exception of oozing around the clamp, and enabled me to insert sutures and control the hemorrhage. It is anything but a pleasant position to be in. I also recall a case I had a year ago last winter, an operation on the nose, the so-called Asch operation, in which the patient very nearly lost his life from hemorrhage. Bleeding began four hours after the operation. The ordinary tubes were put in. The patient was taken from the operating-room and carried to his room. He had no history of a bleeder and there seemed to be no reason why he should bleed any more than any ordinary case. Four hours later I found he had been vomiting blood, and upon examination I found him unconscious and that the bleeding had partially stopped because of his weakness. I removed the tubes from the nose and I found blood was oozing from the back part of the septum. The patient began to sink so rapidly that I did a transfusion and then packed the nose. Finally I stopped the hemorrhage by taking an ordinary piece of sterilized gauze, filling it with cotton-wool and packing the posterior pharynx as well as the nose. The case seemed to be doing all right. But two hours later I was called by telephone and the nurse said the patient was again bleeding freely. I again found the condition I have just described. The patient responded rather more quickly to the second transfusion than to the first, and I again packed the nose, soaking the gauze and cotton-wool this time with a styptic. Whether this had anything to do with stopping the hemorrhage I do not know, but there was no recurrence of the hemorrhage thereafter. I am opposed to doing the Asch operation and fracturing the bony parts, because of the danger of hemorrhage.

Dr. Chas. W. Richardson, Washington: Mr. Chairman:—This is developing into an experience meeting, and experience is good sometimes. Dr. Myles has given us an interesting subject for discussion, with which we have all had experience. In his abstract he speaks about hemophilia and then he asks himself the question when should we not operate, that is, as I understand him, in cases of people who are not hemophilic but yet bleed considerably when wounded. I think it is wise in such instances not

to operate unless you place the case fairly before the patient, stating the danger of the attempted operation, and then if they are not willing to submit to an operation it would be much better for you to allow them to go to some colleague who is willing to operate and suffer the annoyance from a troublesome hemorrhage. I must say that I appreciate the Doctor's remarks about watching the patient and that cannot be too strictly adhered to in any intranasal or post-pharyngeal operation in which an extensive surface is wounded. Most of these cases do not bleed immediately after the operation; the troublesome ones very rarely do. It is after they have gone home or after you have left the the hospital three or four hours that a little oozing begins and afterward rapid bleeding, so that in an hour or so your patient's life is in danger. I always have these patients closely watched, and whenever I do any operation on the septum or posterior pharynx I do not move without having myself in telephonic communication with the patient. I think it is very unwise to do so, and I never now operate upon an individual from a neighboring village or town and let him go home immediately, no difference how trivial the operation may be. I make these patients stay in the hospital. I have had an experience such as Dr. Myles has related, especially in his second case that vomited blood. I did a septal operation on a young boy in the early afternoon, and cautioned the people, telling them that the boy might vomit blood once, but if he vomited blood a second time to notify me immediately. About 8 P.M. the father rode up, walked into my office in a very nonchalant manner and said, "Doctor, George looks very good, but he has vomited blood three or four times and I thought I would come up and notify you." I reached the house just in time to save that boy's life. On entering his room I found the windows wide open and the patient was restless, demanding air. He had lost an enormous quantity of blood, which he had been swallowing continuously. The boy's life was saved. But we cannot impress it too strongly upon these people, and I think it is well to put these patients under the care of a good, well educated nurse who understands rhinological work, the dangers of hemorrhage. In the case of a child, the nurse should be particular to question whether the little patient is swallowing blood and should occasionally examine the pharynx to see whether blood is dribbling down behind the posterior pillars. You will find it running down beside the posterior pillars, either on the right or left side. I was very much pleased with the remarks that Dr. Richards made about stopping hemorrhage with the hemostatics. I several times have stopped hemorrhage from the tonsils with hemostatics. There is a point that I have not seen well brought out, which I think it is very important to state and very important to pay attention to, and that is, after the amputation of the tonsil, if the patient commences to bleed at the end of two or three hours, you have not time to waste with anything but the most positive methods to arrest the hemorrhage. It means that you are going to have a trouble-

some secondary hemorrhage from one of the tonsillar arteries. That has been my experience. If the tonsils are going to bleed without giving us any trouble, they commence to bleed at once and bleed a teaspoonful or half an ounce of blood and then it is all over. The cases that cause trouble begin two or three hours afterward, after the vessels regain their tonicity, when the primary clots are forced out; and the best way to control this hemorrhage is with hemostatics, crushing all the tissue you can. I was very much interested in Dr. Dawbarn's case of suture with the purse-string suture. But when you have a jet of blood shooting across the patient's larynx, certainly not one patient in a hundred will be quiet while you place the suture around the tonsil. I thought Dr. McKernon was going to take some of my fire when he spoke about his forceps. I have an instrument, which I bought some ten or fifteen years ago. I have forgotten the name of the maker, although I saw it mentioned only a short time ago. I happened to be in a shop and this instrument struck me as being something that I would need some day and I purchased it. It is an instrument intended to stop tonsillar hemorrhage. It has two long blades, one with a conical shaped hard-rubber pad, which can be covered with lint or gauze, while the other blade has a kidney-shaped pad which rests on the angles of the jaw. It is brought tight in position and fixed by a ball chain. In one case I tried to introduce hemostatics and almost everything else, but still the patient bled until both he and I were almost exhausted. I then introduced this instrument, brought my clamps to and not another drop of blood was lost. Of course it is a disagreeable instrument to use, for the patient, but it did good service in that case and I believe it would have been impossible otherwise to have stopped the hemorrhage. Gentlemen, I am taking a lot of time, but this is an interesting subject. Then the Doctor spoke about cutting the artery of the septum. I have had that occur three or four times and I found I could stop that quickest and easiest by introducing a small pad of iodoform gauze that would just barely fit tightly into the posterior nasal orifice, which is introduced from the pharynx and drawn forward into the nasal cavity until it fits snugly on the bleeding point.

Dr. H. W. Loeb, St. Louis: Mr. President:—I have had no experience with tonsillar hemorrhage I think for the good and sufficient reason that I have confined my operation to the use of the electrocautery snare and knife. I hope at the next meeting of the Society to give all the members of this Society a chance to oppose that method. I do not use the tonsillotome but the snare, and I take the mass entirely out. With reference to the question proposed by Dr. Myles, in regard to whether we should perform the double operation, that is the removal of the tonsils and adenoids, I would say that I frequently do the double operation, first remove the tonsil and follow it up with the adenoid operation. Just as they are recovering from the chloroform they are ready to get rid of the blood from the adenoid operation. I

have had one very interesting case of hemorrhage from the pharynx. It was a case of fibro-chondroma of sarcomatous type and containing a large number of blood-vessels. The cartilaginous tissue was of the yellow variety. The mass recurs and the patient keeps returning to me for the removal of it. In regard to the hemophylics, I have seen it recommended that a transfusion of salt solution be used before the operation. I have had no experience with hemophylia to any considerable extent.

Dr. Edward Fridenberg, New York: Mr. President:—In tonsillotomy and the removal of adenoids, it has been my custom to use strong peroxid of hydrogen both in spray and on tampons. I have had only one case of tonsillar hemorrhage sufficient to give trouble, and that was controlled by blowing on the surface some ferropyrin. I always remain with the patient until the hemorrhage ceases and then I direct the nurse or attendant to keep the patient lying on his face. If any hemorrhage ensues, it stains the pillow and is immediately recognized. After the patients recover from the anesthetic they are requested from time to time to expectorate to show if there be any hemorrhage.

Dr. Price Brown, Toronto: Mr. President:—We all know that in removing polypi with a snare we rarely have severe hemorrhage. Some seven years ago I had a patient, a lawyer, who had a large number of polypi in each nostril and I removed them all at different operations, with a snare, until finally he got apparently entirely well. He was free from nasal trouble for about three years, when they developed again. He then came to me and I removed all that were present. He returned about two years later and again I removed a number of polypi. He went home. I used nothing but the snare at the time and there was no great amount of hemorrhage. Four days later I was summoned by his regular physician, who said that the patient was in a dangerous condition with a high fever. I went to see him and found that after returning home from my office excessive hemorrhage took place. His physician was sent for and he at once packed the nostrils full of cotton-wool. His temperature when I saw him had risen to 104°, partly due, no doubt, to the septic condition of the wool in his nostril. Since reporting the above the same gentleman again called upon me for treatment. On examination I found two nasal polypi in each middle meatus. They were all removed by snare without other treatment. The hemorrhage at the time was not severe. Three hours later I was summoned and found the patient almost collapsed from loss of blood. It required to use Bellocq's cannula and anterior plugging to stop the hemorrhage. He recovered rapidly. He is plethoric, a bachelor, weighs over 200 pounds, and is about 40 years of age.

Dr. D. Braden Kyle, Philadelphia: Mr. President:—Much has been written lately in regard to the use of the suprarenal capsule in controlling hemorrhage. I have experimented somewhat in its use in the clinic at Jefferson Hospital and in my private practice and I must say I have not met with the good

results that many others claim. Perhaps it is my fault in not using it properly. The most satisfactory results were obtained by the use of the glycerated or borated preparations. I have used it in some eighty or eighty-five cases, applying it to the membrane before general anesthesia and in some cases applying it after operation. I have also used it before applying local anesthetics, such as cocaine, repeating the application after the use of the cocaine and before the operation. In a very limited number of cases did it control the hemorrhage to any extent. In a few cases, however, it did work admirably and there was practically no hemorrhage at the time of operation and in one case after the removal of a turbinate bone there was practically no hemorrhage and it was noticeable that there was a limited amount of soreness and inflammation after the operation. I think, however, that in suprarenal extract we have a drug which will be a valuable hemostat.

Dr. G. Hudson Makuen, Philadelphia: Mr. President and Gentlemen:—I may say that I have used the Berrian sponge with great satisfaction in several cases of nasal hemorrhage. If one knows the exact location of the bleeding point, it is a very easy matter to place the sponge opposite this point and with its saturation comes the pressure necessary to control the hemorrhage.

Dr. John A. Thompson, Cincinnati: Mr. President:—In the paper there is nothing as to the best means of preventing hemorrhage during operation. My experience with the use of the adrenal extract is comparatively limited, but with it I have succeeded in removing growths from the nose with almost no hemorrhage. I tried it recently in an Ashe operation for deflection of the septum and while it did not control the hemorrhage entirely, it did diminish it.

I was interested in what the essayist said of hemorrhage from the nasal branch of the sphenopalatine artery. I have operated on a case in which the artery ran over an exostosis of the vomer. I will remember for a long time my experience in trying to control that hemorrhage. Whether the adrenal extract would have any effect on the hemorrhage in adenoid operations we do not know. I have followed the plan, after the patient is thoroughly anesthetized, of turning him on the left side with a pillow under the shoulder so as to leave the head the lowest part of the body. Then I insert a mouth-gag and remove the lower tonsil. I then make pressure on the stump with a cotton sponge saturated with Mackenzie styptic and my assistant gives the anesthetics until the child is thoroughly under its influence again. The pressure is continued while the anesthetic is being given for from three to five minutes. The upper tonsil is then removed and the pressure applied in the same way. Finally the adenoids are removed. By following this plan I lose much less blood than by the older methods. Since I had adopted this plan of stopping the hemorrhage of each wound as made, I have had much less trouble from hemorrhage.

Dr. Robert C. Myles, New York: Mr. President:—I think

the abstract has caused more discussion than the paper would have done. The paper will be published later and will answer some of the questions asked.

The objection to the individual statistics, with many operators is, that they consider them most important. I think it was said that Sir Morrell Mackenzie never had a severe hemorrhage after tonsillotomy. I started out with the idea that I would not have any, but in about the thirtieth case, it occurred in the case of a lawyer. He was nearly a year recovering from the ill effects caused by the loss of blood. He became a thin, cadaverous looking individual, and was formerly strong and robust. I think the statistics of all operators belong to each one of us, and it is the results of all the others that we must examine carefully.

For instance, I dare say that some of us give chloroform in adenoid operations, yet when we take the statistics of 19 deaths in five years from chloroform alone, it is something appalling, and when we take into consideration the percentage of deaths we realize that the accident may happen to any of us at some time. I have no fear of hemorrhage from the nose or throat, if I can see the case before much blood has been lost. Pressure may not relieve it in the latter stages, because the blood is thin and runs through the compress, but in the incipient stage one would have an opportunity to stop it: being greatly aided by the coagulative quality. Often there is considerable hemorrhage before absolutely firm pressure is put on and one has lost the golden opportunity. The young assistant may put in a posterior tampon or apply pressure in many ways, but he goes at it in such an awkward manner, because he has not been properly drilled on a cadaver. His faltering methods are frequently the source of much of the evil consequences following the excessive loss of blood. The surgeon cannot always be in the hospital and the assistant physician should be able to effectively tampon these cases. With the suprarenal extract I have not had much experience in cases of post-operative hemorrhage.

PAPER:

APPROPRIATE TREATMENT FOR CERTAIN VARIETIES OF NASAL DEFLECTIONS AND REDUNDANCY.

BY D. BRADEN KYLE, M.D.

It is not my purpose to review the entire subject of nasal deflections, with the various methods of correction by surgical procedure; the field has been too thoroughly gone over within the last few years to necessitate repetition. The object of the paper is to call attention to certain varieties of deflection, with treatment suited to each peculiar variety. It is impossible to formulate rules for the correction of deformities which are applicable in all cases; the location of the deformity, the contour of the nasal cavities, the thickness of the nasal septum, the general systemic condition of the individual necessarily controls, in individual cases, the variety of operation to be employed; indeed, each individual case will necessitate the modification of our own method.

VARIETIES.

The varieties of deflection considered in this paper are:

(1) The split cartilaginous septum, with bulging into both nostrils.

(2) Dislocation of the columnar cartilage.

(3) Simple deflection in which the cartilage is very thin.

(4) The letter S deflection.

(5) Deflection of the cartilage, with involvement of the bony septum.

(6) Deflection due to the splitting of the cartilage, with bulging on one side only.

(7) Deflection in which there is redundancy of tissue overlapping the septum and extending close to the floor of the nose.

DEFORMITIES OF THE SEPTUM.

In a perfectly formed nostril the septum should be perpendicular to the floor of the nose, separating the two cavities into chambers of equal dimensions. As a rule, however, there is a slight difference in the size of the two nostrils, the septum frequently deflecting to one side. This may become more pronounced in adult life, owing to irregular change within the cartilaginous structure. The tendency to deviation is also increased by inflammatory processes. It is almost impossible to describe the various deviations or deflections of the septum, as each individual case

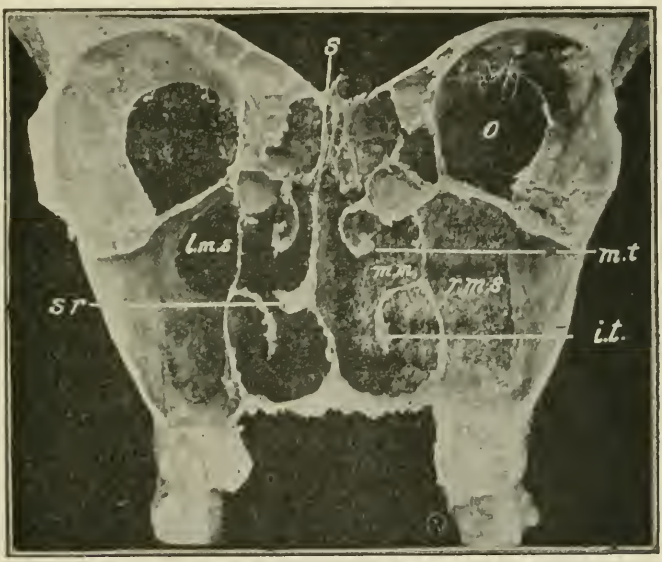

FIG. 1.

will present slightly different features. The curvature in the septum may be either longitudinal or perpendicular. It may be a single curvature, or it may be of the letter S, or scroll-shaped variety. It may be limited to the cartilaginous portion or may involve both cartilage and bone, rarely ever involving the bony septum alone. As to the general causes, deflections may be divided into (1) Deviation, or deflection from disease; (2) Traumatic deflection; (3) Congenital deflection.

1. *Deviation or Deflection from Disease.*—Deflection of the septum may be brought about by disease occurring directly in the structure, or as a secondary condition depending entirely upon some constitutional lesion. Inflammatory processes, involving the mucous membrane lining the cartilage, may so weaken it as to permit of slight deflection. This is especially true in purulent rhinitis in children, also in the strumous and the rachitic diatheses. Atrophic rhinitis has been granted by some authors as a possible cause of deflection. It is possible that in the early stage of the inflammatory process the cartilage, owing to its inflamed condition, and, possibly, to its irregular, uneven development from muscular action of the external nasal muscle, may be slightly deflected. However, I think, as a rule, the deflection existed before the atrophic rhinitis and was more an exciting factor than a result of that process. Deviations may also follow in childhood upon disease of the teeth, especially during first dentition; and, if early recognized, many cases might be prevented. Superficial ulceration in syphilis, tuberculosis, and lupus without actual perforation may cause deflection and deformity. Simple ulceration, as well as ulceration following diphtheria and typhoid fever, are also exciting factors in deflection. Perichondritis, whether associated with any specific inflammation or not, may result in deflection. Enlarged turbinated bones by pressure on the septum, with the resulting inflammatory changes, will produce deflection; the same can be said of tumors. In uric acid diathesis there is pronounced irritation of the mucous membrane, which may result in perichondritis and tend toward deflection. Deviation due to simple abscess of the septum presents a very small scar on the surface, while that due to a specific process will present considerable scar tissue (pug-nose). Perichondritis, regardless of the cause, may result in the destruction of a portion of the cartilage, leaving the soft parts intact; yet sufficient of the cartilage is destroyed to give marked deviation and deformity.

2. *Traumatic Deflection.*—Deviation of the septum from injury occurs most frequently in childhood, although it may not be recognized until adult life. Children are subjected more often to injury of the nose, and at the same time little attention may be given to trauma, which may later result in a serious deflection. Owing to the flexibility of the cartilaginous septum, blows of sufficient force to cause deflection of this structure must necessarily involve the bony septum. Great difficulty may be experienced in determining the cause of the deflection, yet fre-

quently when the patient is conscious of the obstruction or irregularity of his nostril he will state that it followed a severe blow on the nose. Such an injury may occur in a child that is not of sufficient age to recognize the importance of nasal breathing. Through fear of treatment it may say nothing about the injury, although the deflection or the thickening produced by the callus, thrown out after the fracture of the bone or cartilage, may almost obstruct nasal breathing on one or both sides. In any variety of deflection the deformity may be purely internal, although in deflections due to blows it is usually noticeable externally. The direction of the blow and its force determine the degree and variety of deflection. A peculiar case, illustrating the effect of a blow on the nose, I observed in my private practice.

A young man twenty-two years of age, while playing foot-

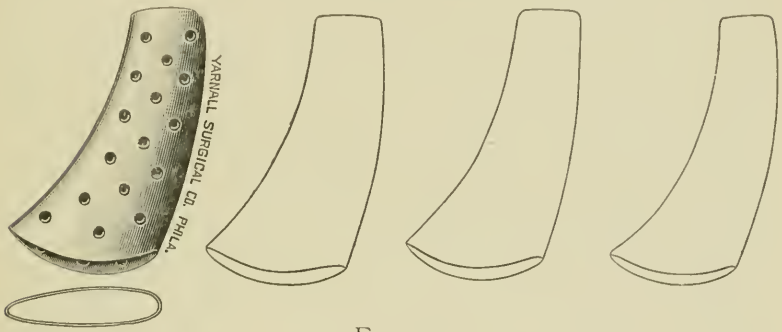

FIG. 2.

ball, received a severe blow directly on the nose colliding with the head of another player. The injury was followed by considerable external swelling, but in the course of a few days all external inflammatory symptoms had disappeared. However, the obstruction to the nasal breathing continued, although after some two or three weeks, when the internal swelling had entirely subsided, there was considerable improvement in this as well. When examined some three months afterward, practically no external deformity was noticed, there being no change in the facial contour. Rhinoscopic examination, however, revealed the cartilaginous septum bulging into each nostril, occupying at least two-thirds of each nasal space. By pressure within each nostril the cartilage could be pushed back to the median line. The force of the blow had simply separated or split the cartilaginous septum. This was crushed sufficiently to permit of its being easily held in

position and sufficient irritation set up to produce an inflammatory exudate between the two layers to allow union, which was held in position by the author's modified Mayer's tube, as described in Fig. 2.

Traumatic deflection and deformity may be of sufficient gravity to necessitate extensive surgical interference. This is especially true when the bony nasal framework is involved.

A deflection of traumatic origin frequently occurs just within the nasal orifices. The irregularity of the cartilaginous septum itself being slight, the deflection is due entirely to a dislocation of the anterior end of the septum from the *columnar cartilage*. Owing to its location the deflection is sufficient to cause obstruction to nasal breathing. It shows as a prominence, with a smooth covering of thin mucous membrane, which is usually slightly inflamed owing to the mechanical irritation necessarily produced by its unnatural location. It is situated just within the anterior nares and extends to the mucocutaneous surface. There is a slight depression in the opposite nostril, corresponding to the prominence. The prominence is often seen without the aid of the nasal specula. While this deflection is usually the result of injury, it is frequently met with as a consequence of disease or as a malformation in the sense of irregular development. The dislocation may produce deformity, the tip of the nose often drooping or deflecting slightly to one side.

Slight dislocation occurs in a larger percentage of cases than is usually believed. The condition is rarely, if ever, of such gravity as to require surgical interference, unless it is associated with deformity of the cartilaginous or bony septum. If the cartilage is split, and the depression on the opposite side is slight, the obstructing cartilage should be removed. This can be done without fear of the tip of the nose drooping if the opposite side be intact. The mucous membrane should be dissected free from the cartilage, the cartilage removed and the flap is then allowed to drop in position. Owing to the vascularity of the tissue it will repair rapidly, and it is not necessary to stitch the membrane in position. The surface should be kept clean with warm boric-acid solution, 10 grains to the ounce, and the nostril should be loosely packed with cotton saturated with hydrogen peroxid—for protection and not pressure.

3. *Congenital Deflection.*—I believe that many cases of the so-called congenital deformity in the bones of the nose are due to the fact that at birth during labor, owing to the position of

the head in the birth canal, considerable pressure has been exerted on the soft, almost cartilaginous, bones of the nose. It is a well-known fact that much can be done toward the shaping of the nose at this time.

Again, that the free passage of air through the nostril has much to do with the regular development of the nasal fossa, as well as the formation of the superior arch and the asymmetry of the facial bones, I have frequently observed to be true. This is well illustrated in the irregular facial deformity, especially of the superior maxillary bones with irregular development of the teeth, which is seen when the nasopharynx is obstructed in early life by adenoid vegetations. The poor breathing through the nose allows the bones to form so as to produce the narrow slit-like orifice, and often the high V-shaped hard palate, so commonly found in the mouth-breathers.

Again, in the constant sniffling which is noticed in children with obstructed nasal breathing, a continual drawing down of the facial muscles, while the bony union is taking place, will cause narrowing of the arch and give a peculiar dish-faced expression.

I believe that the importance of the effect of perfect nasal respiration in early childhood on the regular formation and shape of the nasal cavities, thereby controlling the facial expression, cannot be overestimated. At least, observation shows that individuals who in childhood have perfect respiration have a regularly formed upper jaw, regularly formed teeth, with perfect facial contour, while those with imperfect nasal respiration show exactly the opposite. I assert, then, that what is often termed malformation or congenital deformity is, in reality, developmental deformity, brought about by imperfect nasal respiration, or imperfect and irregular development due to bad systemic nutrition or dyscrasia. The worst feature of these developmental deformities is that, unless perfect nasal respiration is established *early in life*—*i. e.*, before the fifth or sixth year, or not later than the seventh—the bony and cartilaginous framework becomes so firm that little can be done toward increasing the nasal space for breathing, and the individual will of necessity be a mouth-breather for life.

Treatment.—To give a plan of treatment that would be applicable to all cases of deviation and deflection would be impossible. Many methods have been advanced, and there are many modifications of the various methods presented, which are in reality only some modification of Adam's original operation. Yet

each individual case with its own peculiarities and variations demands its own special modification of treatment.

There is a variety of deflection, invoking only the cartilaginous portion, which is very thin and flexible. By inserting the finger into the nostril the septum may be straightened back to the perpendicular. In such cases it is not necessary to lacerate in any way by holding it in position with pins or by cutting it to weaken it, so as to be held more readily in position. The plan which I have found very successful—merely a modification of the pressure-method suggested by Quelmalz—is in the use of a flexible or rather malleable tube, which is shaped first to fit the deflection, then by gradually widening the tube there is gradual pressure brought to bear on the deflected part, producing a slow, inflammatory process. The tubes, as shown in Fig. 2, are inexpensive, and should be made to suit each case. The caliber of the tube is increased or diminished to

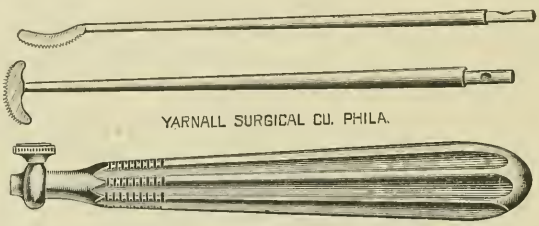

Fig. 3.

suit the amount of pressure required. As a rule it will necessitate the wearing of the tube from five to twelve hours each day for two or three weeks, although frequently it can be left out as long as three or four days at a time. The tube should never be allowed to remain in sufficiently long to produce ulceration, but, if the directions given above are followed as to the length of time it should remain in position, ulceration will not occur. This gradual pressure will from inflammatory organization thicken the septum, increasing its strength.

Deflection of the septum does not always demand surgical interference. While any irregularity in size or unevenness of the contour will tend to promote catarrhal conditions, yet, if there is sufficient space for the free passages of air, operative interference is not demanded.

If the deflection is limited to the cartilage and pressure a regular convex and concave curvature, removal of tissue will not be

necessary, but in the irregular letter S curvature, in which the septum is almost folded on itself, causing redundant tissue, the mass cannot be forced back and retained in position, and will necessitate surgical interference. In the simple curvature, *without redundant tissue,* in which the septum is thick and firm, I have found the following method to be most satisfactory. If the curve extends to the floor of the nostril, or the junction of the cartilage with the superior maxilla, a cut should be made on the opposite side from the deflection, close to the base and extending through the mucous membrane to the cartilage. Then by means of the nasal saw (Fig. 3), the cartilage should be cut to about one-third its thickness. If, however, the curvature does not extend to the floor, this incision may be omitted. The patient should be anesthetized, and by the use of the forceps, showing Fig. 4, the cartilaginous septum is fractured or crushed by rolling the forceps. The rounded blades prevent laceration of the tissue. This will permit of the moulding of the

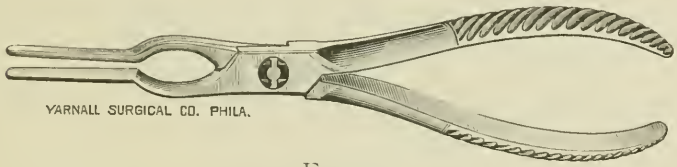

Fig. 4.

septum into the desired shape and position. It should then be retained in position by means of the tubes described in Fig. 2. If within the first twenty-four to forty-eight hours there are marked swelling and edema, the tube should not remain in position, as the parts can easily be moulded up to this time, since no inflammatory organization will take place under forty-eight hours. If, however, the swelling is not marked, the tube may be left in position from the first. The diameter can be controlled by the pressure and support desired. While the tube is in position the nostril should be flushed every two to four hours, depending on the amount of secretion, with a tepid solution composed of boric acid, 10 grains; carbolic acid, 2 drops to the ounce of tepid water. Until the fifth or sixth day, should there be considerable swelling, causing marked pressure, the tube should be removed from the nostril daily and allowed to remain out at least eight to ten hours; this will prevent any likelihood of ulceration. Should this same curvature extend back to the bony framework, the same method

should be employed, except that in order to *control the line of fracture* of the bony septum after cutting through the mucous membrane, the bone should be sawed by means of the curved nasal saw, shown in Fig. 3, at least one-third its thickness. This should be done at two points so as to divide the septum into equal thirds (Fig. 5). The line of fracture will thereby be controlled, as the septum is crushed by the rolling forceps. If the bony portion is thick and firm, the incision may have to be made deeper than one-third. If more force is required to correct the deformity

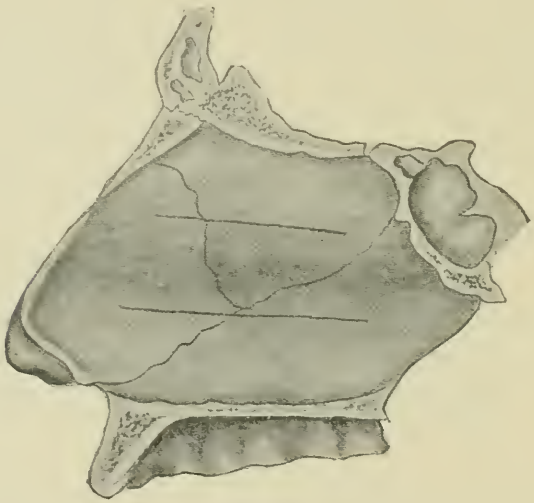

FIG. 5.

than can be exerted by the rolling forceps, the dilating forceps should be used:

The septum should be retained in position in the same manner as described above. If the deflection is a vertical one of the triangular or V-shaped variety, before crushing, two vertical incisions should be made two-thirds of the entire perpendicular length, dividing the deflection into equal thirds. This can be done by means of the saw shown in Fig. 3. The straightening of the septum and its retention in position can be accomplished as described above. As a rule, in deflection or deviation of the septum there will be found, in the large nostril, or that corresponding to the cavity of the septum, enlarged turbinates with thickened mucous membranes. These should be removed before the septum is straightened; otherwise, when it is forced back into position and

the obstructed nostril relieved, there will be produced obstruction in the opposite nostril, or merely a transferrence of obstruction from one side to the other.

The tubes described in Fig. 2 are modified after Mayer's or Asch's patterns, and differ very much in shape from the metal tube devised by Harrison Allen. The advantage of the tube seen in Fig. 2 is that it can be moulded to fit any nostril, and the pressure can be controlled. The metal is soft so as to allow its being cut very easily with an ordinary knife, in order that the tube may be shortened at will and adapted to individual cases; besides, the surface impinging against the septum is flat, thereby distributing and equalizing the pressure, with less likelihood of ulceration. The tube can be indented to fit any projecting point on the septum, lessening danger of ulceration from pressure. The outer surface may also be rounded and moulded to fit the turbinal surfaces so as not to permit of excessive pressure on any one point.

While I am aware that the method given above demands considerable attention on the part of the operator, yet from my own experience with the various other procedures employed for the variety of deflection given, I find none so satisfactory. In 37 cases I have had failure in 6. Two were cases where there was redundant or excessive stricture, in which, owing to the excess of tissue, the septum could not be forced back and held in the median line. In 3 cases I did not sufficiently crush and weaken the septum, and the pressure was so great from the nasal tube that ulceration was threatened, necessitating the removal of the tube. Unfortunately, the tube could not be retained in position long enough to support and hold the septum in the perpendicular line. This necessitated a secondary operation, in which the septum was more thoroughly crushed. In another case, the deviation was not only cartilaginous, but extended into the bony structure. Two days after operation the case was complicated with an attack of grippe. On account of the suffering of the patient from the combined condition, I deemed it advisable to remove the tube, which exerted sufficient pressure to retain the fractured bone and cartilage in the correct position, I was compelled to use a smaller one, and, although the result was fairly good, yet the complete establishment of normal nasal respiration was not accomplished.

Another variety of deflection of the septum occurs, in which there seems to have been splitting of the two halves, with bulging on only one side, the opposite side being almost perpendicular. The deflected portion assumes an acute angle, the apex

of which is markedly thickened. In such deflections all that is necessary is that a semicircular incision be made under portion of the projection (Fig. 6), the mucous membrane dissected up, and the underlying cartilaginous or bony projection sawed off. Great care should be taken not to penetrate the septum or injure the mucous membrane or blood supply of the opposite side, thereby lessening the danger of ulceration and perforation.

In cases of deviation or deflection of the cartilaginous septum, in which there is redundant tissue, the cause of failure in operations has been due in most instances to failure in removal of this redundancy. There is too much tissue for the space into which it has been crowded, and hence when compressed or forced into a normal position in the median line, its resiliency tends to force

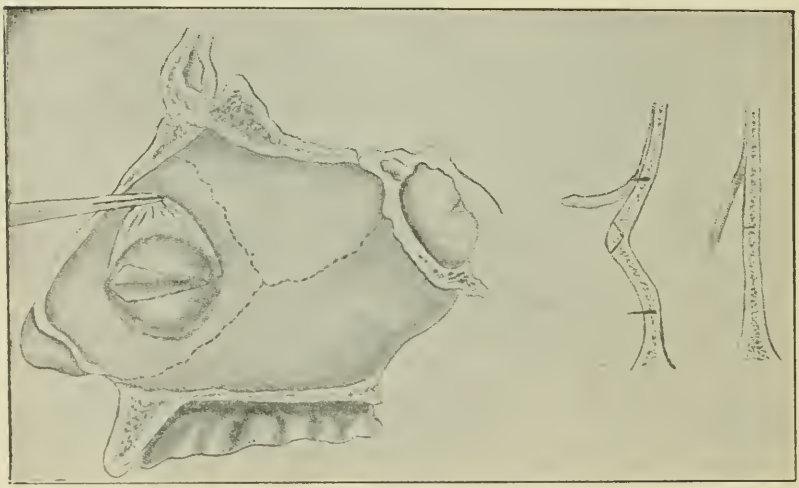

Fig. 6.

it back into its former abnormal position or an equally obstructive one. For the correction of such deformities, where the redundant tissue is limited to the cartilaginous portion, the mucous membrane should be dissected up and the V-shaped portion of the cartilaginous septum (Fig. 6) be removed, the amount removed depending on the extent of the redundancy. This should be done by sawing into the cartilaginous septum, being careful not to cut through the mucous membrane on the opposite side. This incision in the cartilage may be made by means of the saw shown in Fig. 3, or the knife or gouge. After the V-shaped incisions are made,

the detached portions of cartilage should be carefully dissected off by means of the dry dissector, although in many cases the detached piece of cartilage can be readily dissected by the use of the finger-nail. The same method should be followed where spurs form.

The after-treatment should consist in freeing the nostril of any retained secretion, but better results are obtained if the parts are not irritated by repeated douching. Sterile water with 5 to 10 grains of boric acid will render the surface sufficiently clean.

Much of the success in treatment of straightening of the septum by the use of malleable metal tubes depends upon careful attention on the part of the operator. The patient should be seen frequently and the caliber of the tube altered, so as to prevent too long-continued pressure in one place, thereby lessening the danger of ulceration; for, if ulceration occurs from pressure, it will necessitate the removal of the tubes for a time sufficient to allow healing of the ulceration, and possibly cause failure to straighten the septum. A variety of deflection situated anteriorly at the floor of the nose is frequently associated with lesions of the central incisors. This is especially true when the alveolar process of the upper jaw is thin and the tip of the root of the tooth is in close contact with the floor of the nose. The irritation produced by the accumulated secretion beneath the projection on the septum, causing perimetritis.

Each deflection will require some modification from a given method, and no one operation will answer in all cases. This is shown by the many methods proposed. The conditions presenting, however, will necessitate a combination of methods rather than the following of any one method.

PAPER:

ON THE USE OF RUBBER SPLINTS IN THE TREATMENT FOLLOWING INTRANASAL OPERATIONS.

BY J. PRICE BROWN, M.D.

In the August number, 1898, of the *Journal of Laryngology, Rhinology and Otology,* Richard Lake had a short article on the use of rubber splints in the intranasal work. I was impressed with his views at the time, as they seemed to supply a much needed want.

In my own experience, covering a period of more than ten years, devoted to special work upon diseases of the nose and throat, the evil effects of septal deformity could in the large majority of cases be removed by widening the narrow nasal passage without resorting to fracturing or straightening the septum itself. Let a clear open chink be made, if only wide enough to prevent accumulations of mucus between the turbinates and the septum, and the catarrhal difficulties caused by the obstruction will, after healing of the mucous membrane, be in a great measure removed.

We rarely find, even in examination of healthy individuals, that the two nasal passages are approximately alike, the distance between the septum and middle and inferior turbinates on the right side differing from that on the left in the majority of instances. Still, provided the narrow passage is open, a considerable difference in the lateral dimensions of the two will have little or no injurious effect upon the secretions of the mucous membrane.

Disease, however, arises when, from one cause or another, the septum touches the turbinate, or when the chink of the inferior meatus becomes so narrow that the mucous secretions accumulate in the passage, thereby inducing post-rhinal catarrh and preventing normal respiration on that side. In dealing with these cases, it is not the operative but the post-operative trouble that I have usually found the most troublesome. By saw or knife, drill or scissors or curette, single or combined, the projecting spur or ridge might be removed; synechiæ connecting the turbinate with the septum could be excised; or a partial turbinectomy, when necessary, might be performed; but to procure smooth equable

pressure upon the incised tissues during the process of healing has been a much harder matter.

Some years ago a paper of mine on "Silver Tubage in Certain Cases of Septal Deformity" was read at the Laryngological Section of the American Medical Association in San Francisco, dealing to some extent with this subject. In many cases these silver tubes are useful, but in many others they are inapplicable; and in the latter class, in which the chink can only be a narrow one at best, I think that rubber splints, made as Lake advises, from thick rubber sheeting, do better work than anything else we have at our command. Their surfaces are smooth, compressible, and elastic; they can be readily cut to the required shape and they can be obtained of any thickness we desire.

After cocainizing the parts, and coating the plug with vaseline, it can readily be placed in position. Once in, it will retain its place and, by elastic pressure, give a smooth and even support to the raw surface to which it is applied, as well as prevent that profuse granulation which otherwise would sometimes occur. At the same time it does not retard the gradual extension of the new mucous membrane, while it moulds the tissues into a smooth and regular form.

The stiff pliable rubber, although not so hard on the surface, nor possessing the polish of vulcanite, is probably just as impervious to bacterial invasion. Sometimes, however, after prolonged use, it will acquire a peculiar unpleasant odor, in part arising from the rubber itself. In these cases new splints or tampons should be substituted for the old ones. As I have used these rubber plugs in a good number of instances, I might briefly quote the following ones from my case book.

Case I.—October, 1898. A boy, aged 6 years, was brought by his mother to the Western Hospital for treatment on account of entire inability to breathe through the right nostril. This had been coming on gradually for several years, occasioned, the mother thought, by a fall on the face when two years old.

There was nothing striking about the external shape of the nose. There was, however, a marked curvature of the cartilaginous septum to the right, with a longitudinal ridge at its base. Chloroform being administered, the ridge was excised. Then, to lessen the resistance, I cut into the convex surface of the curvature of the cartilage from behind forward. In one spot, although guarded by the little finger in the opposite nostril, the knife accidentally penetrated through the septum. Not heeding this,

as it probably would unite by first intention, a rubber splint one-eighth of an inch thick, long enough to go beyond the triangular cartilage and as wide as the fossa would admit, was pressed into the nostril.

The child was kept under observation but the plug was not removed for two weeks. It was then found that the perforation had healed, and that the nasal passage was patulous. After cleansing, the splint was replaced and worn for several days more. The right passage was almost as large as the left and the patient was discharged, cured.

Case II.—December, 1898. A gentleman, aged 58, came for treatment for left nasal stenosis and "throat dropping." He stated that thirty years before, while at college, he went to a surgeon about his nose. The advice that he received was that there was a growth in the left nostril, but that it would be a difficult and delicate operation to remove it, and that unless it occasioned serious trouble he should leave it alone. He followed the advice given; and it was only during the last few years that it had given much inconvenience.

On examination I found a curved septum and a large round cartilaginous spur, filling up the anterior portion of the left nasal cavity. It was pointed, and impinged upon the opposite wall, just in front of the anterior end of the inferior turbinate. Behind it, the osseous septum was also curved for the greater part of its length toward the left side.

With a sharp curved knife, I excised the spur deeply, leaving a clean-cut surface. As this was followed by profuse hemorrhage, the naris was packed with absorbent cotton. On removing the tampon the following day, I found that the congested walls completely filled the cavity behind the site of operation; so after applying cocain and thus shrinking the parts, I at once slid in a rubber splint, the end being beveled to facilitate its entrance. It was made of sheeting two-eighths of an inch in thickness. Slight irritation existed for a day or two but this soon passed away. At the end of the week it was removed. By this time congestion was over, the surface was smooth and it healed without further difficulty leaving a clear narrow chink.

Case III.—February, 1899. A carpenter, aged 23, had his nose broken when a child by a fall, producing a partial depression of bridge. For years has had almost complete stenosis on left side, resulting in pharyngeal catarrh and edema of uvula.

Examination.—Right nasal fossa enlarged, presenting concave,

book-notched septum on that side. Mucosa healthy and without catarrhal accumulation. On left side, large curvature with cartilaginous spur filling in the passage, together with osseous ridge extending to the posterior choana. In the center a bony synechia connected inferior turbinate with septum.

The first operation was to remove the cartilaginous spur and put in a thick rubber splint. Four days later the osseous ridge with synechia was sawn out, and after hemorrhage had subsided, a long splint extending to the posterior naris was inserted. For a few days it was not disturbed. Then it was taken out daily, and after being cleansed, returned. The excisions in the case were very extensive. Still in six weeks the healing was very satisfactory, resulting in a clear chink from end to end of the passage with rapid reformation of mucous membrane.

Case IV.—April, 1899. A boy, aged 7 years, was brought as a mouth breather for treatment. He had been stunned by a blow with a stick on the forehead when four years old. From that time, it was said, nasal breathing gradually became more difficult and finally ceased.

Examination.—Curvature of cartilaginous septum to left with ridge at base, columnar cartilage curved to right, also adenoids in nasopharynx. Chloroform was administered. Ridge was first excised with knife. Then two longitudinal incisions from behind forward were made through the cartilage on the curved side, the finger in the right nostril acting as guide to protect the mucous membrane from perforation. A rubber splint two-eighths thick was at once inserted pressing the cartilage into central position. While still under chloroform a slip from the columnar cartilage on the right side was excised, and the adenoids removed.

Two weeks later the rubber tampon was taken out; the result being nasal breathing and good left nasal passage.

Case V.—April, 1899. Youth, aged 17 years. Nose externally twisted to right side. Says he was struck with a ball on the nose two years ago, since which time there has been increasing deformity and considerable nasal stenosis.

Examination.—Extensive ridge spur on left side with curve filling up the fossa, part of the cartilage being adherent to the middle turbinate. Under cocain I excised front part of ridge and after compressing septum to right with chisel, inserted one-eighth in rubber tampon. Four days later, under chloroform, I made two incisions from behind forward through the septal cartilage, guiding, as in case 4, by finger in right nasal fossa and thus

preventing perforation by mucous membrane. I then pressed out septal cartilage by passing two-eighths inch rubber splint. The septum being straightened, the tampon was left in for two weeks. The front part of the fossa being now freely open, a bony ridge extending along the lower part of the vomer was removed by saws, and a long wide tampon one-eighth in thickness but extending from the anterior to the posterior nares was placed in position. After the first day it created no discomfort. As patient was returning home he was instructed to retain it in position for a month.

I might say with regard to the last two cases that the cosmetic improvement will be marked.

My own experience in the use of rubber splints has so far been very satisfactory, and I earnestly recommend a trial of them to members who up to the present have not adopted Mr. Lake's advice in this matter.

In closing I might make one more remark. I have seen somewhere that it had been proposed to manufacture a species of perforated rubber quite distinct from the tubular splints already in use, in order to allow a certain amount of respiration and ventilation through it while in position. This I think would be a great mistake, as it would destroy all possibility of keeping the splints in an aseptic condition. Another thing, the perforations would be so quickly filled with nasal secretions of one sort or other, that the object for which the perforations were made would be nullified.

DISCUSSION.

Dr. CHAS. W. RICHARDSON, Washington: Mr. President:—I am very much interested in this subject, particularly because last year, at our meeting in Pittsburg, I read a paper on the after-treatment of these cases.

There are several points I wish to refer to. First, in regard to the V-shaped ventricle deflections, I would like to ask Dr. Kyle whether he has much success in treating these cases. I have found them the most annoying I have to contend with. The anterior portion has no support and it is difficult to get the splint far enough forward to give it support without great irritation. I would like Dr. Kyle to make specific his manner of treating such cases. With regard to the splint, I think it makes very little difference what splint you use so you can keep the splint clean and it can be made aseptic. I prefer, myself, a splint that has a breathing space through it and I can see no difficulty whatever in keeping such a splint free so that breathing can be continuous; and the splint can be kept perfectly sweet and clean. The

manner of doing the operation depends upon the individual preference of the operator. I don't see why we should speak of Asch's method of doing this operation any more than Brown's or Jones'. I think the man who treats each individual the way that is best and uses the instrument that is best for the purpose in the individual case is the best worker and will secure the best results. The main thing is to get the septum straight, so that when you put your splint in you do not have to use any force. Get the septum so it will stand in position, after you have done your cutting and breaking, so that it will stand almost vertical, so there will be no bending one way or the other. You put your splint in not to force it over but simply to hold it firm. That is the main thing in these cases and unless you do it you have to keep up firm pressure for a time and after you take out your splints you will find it will slip back. The main thing is to get it so it will stand by itself. I never make any pressure. Unless the lower border of the splint lies along the floor of the nose, the splint will not be of any service whatever. In 50 per cent. of cases where it rides over a longitudinal deflection on the floor of the nose, it will be raised and forced out, unless it is large enough to exert pressure on the angle of the nose sufficient to hold it in, which of course is exceedingly painful. As to wearing splints, I have had more pronounced success since I have been allowing my splints to stay in continuously until they are removed. I have had less reaction, no constitutional disturbance and no septic infection. Since I have been allowing my splints to stay in continuously I never have an acute follicular tonsillitis, which previous to the continuous wearing of the splint I used to have then almost always. I consider a case of acute follicular tonsillitis in a case of this kind as nothing but evidence of septic infection. When you have longitudinal deflections along the floor of the nose or extending to the osseous portion of the septum, when you remove the splints on the first or second day you will find that the fragments will be forced out of place. You will have to force them back or ride over them and give the patient considerable pain for several hours. It is not necessary, if you have the parts in good position, to carry the splint more than for or five days and then you do not have to re-introduce the splint, and the septum you will find will remain in position continuously. I wish you would try it. I have met with uniform success. Not occasional success, but uniform success, by allowing the splints to stay in from five to ten days. I have no trouble keeping them clean and I have no septic infection. I simply keep the cavity as clean as possible by constantly washing it. I keep all crusts away and there is no possibility of infection.

Question: How do you keep it clean?

Dr. RICHARDSON: I wash it three or four times a day and remove all the crusts that may be apparent. The cleansing is not a difficult procedure. The patient is more comfortable after the second or third day than he is after the earlier removal of the

splint. On the fourth or fifth day the patient has no discomfort whatever. He feels the fulness and distention, but he breathes easily and often goes about his business as if nothing whatever had occurred.

Dr. J. A. Stucky, Lexington: Mr. President:—I have been pleased to notice that neither of the essayists said anything of the septal punch. I am glad to know that it is going out of use. I am acquainted with Dr. Kyle's splint. One of the advantages is that it is malleable, it is metal and can be easily and readily sterilized. I am surprised at the length of time Dr. Kyle leaves the splint in after operating. Personally, I never leave the splint longer than two or three days before cleansing, and I would like to ask the Doctor how he accounts for the fact that he does not get sepsis by having the secretions retained by a hard splint for that length of time. It seems to me it would endanger the middle ear and also the accessory cavities. The splint also seems rather heavy, and I would like to know whether the patients do not complain of the weight. One of the advantages of the tubular splints is that they can be cleansed; you can spray right through them. The hard-rubber splints cannot be as easily and safely sterilized as you can the metal, and it is almost impossible to mould them so as to change their shape. Dr. Brown's instrument strikes me as peculiar in that it can be used without being cleansed. If I do not take the splints out, there is something in the Kentucky atmosphere that gives rise to sepsis.

Dr. Robert C. Myles: Mr. President:—I think there is a great deal of confusion in the minds of all of us in regard to what the other fellow means when he is writing a paper on this subject. Not long since I had occasion to ask six specialists to write papers on the same subject. I informed several of the authors that many had not been able to comprehend the details of these procedures and I requested them to state. the different steps as clearly as possible. I think the *Laryngoscope* will contain the articles in this month's number.

I believe Bosworth introduced the method of sawing off the redundant tissue, probably 80 per cent. are operated on with the saw at the present time. I refer to the cases of nasal deflection with thickening. Now the pendulum is swinging back again. For a time the trephine followed the saw and with good success; in many cases certain operators advise us to break up the septum thoroughly and overcome all resistance. Do they mean by that that they break the vomen from the nasal spine, do they fracture the perpendicular plate of the ethmoid, or do they separate the cartilage from its bony attachment? My experience has been that it is very difficult to break up these bones, after the manner described by the essayists. I think nearly all the nasal forceps made will enable us to loosen the attachments of the cartilage to the vomer and nasal spine, but will rarely fracture the vomer and perpendicular plate of the ethmoid in a very definite manner.

I think Dr. Richardson is right in regard to removing the

tube. When we remove especially a perforated tube we start about a dozen new wounds. The tissue extends into the interior of the tubes and when we remove them there is considerable abrasion. If the tube is left in this does not occur. And when the tube is reintroduced it tears the tissue. In the cases in which I broke the vomer, even healthy looking young men appeared depressed and had some fever. I have been performing a series of Asch, Gleason and Watson operations and have had excellent results after each method when the cases have been "properly selected."

Dr. Lewis C. Cline, Indianapolis: Mr. President:—I have been very much interested in this subject, especially in the different opinions that have been expressed. My attention was especially called to this subject when I was attending a post-graduate course in New York City. A gentleman presented himself who had been under treatment in one of the London hospitals, who was wearing a long silver tube. The doctor took the tube out before the class, and sawed out a large spur on the septum, and I remember in talking with the gentleman afterward he said he never had such relief, for there was nothing put in but a little antiseptic cotton. He said the tube was difficult to keep clean and it was a great annoyance to him. It was a long tube, as long as my finger. I have tried different tubes, both the rubber and the metal tubes. When I find anything in the nose to take out I use a saw and remove it. I make as clean a cut as I can of mucous membrane and all, and then I put in antiseptic cotton, sometimes iodoform or aristol and such things, and I think I get as good results as any. I do not see why you want to put a brace of any kind in these cases. A little cotton will hold it for a few hours until it becomes set. As Dr. Richardson says, I believe there is nothing to press or hold. All you want to do is to keep it in position until Nature does her work. If you want to keep anything over by pressure, you had better use your drill or saw.

Dr. John A. Thompson, Cincinnati: Mr. President:—When Dr. Brown closes the discussion I would like to know whether the temperature of the cases was taken morning and evening for ten days or two weeks after the operation. If his cases had no fever his experience is certainly different from that of other operators where splints are left continuously in the nose.

Dr. D. Braden Kyle, Philadelphia: Mr. President:—I mentioned several methods, but any method must be adapted to individual cases. As to leaving the tube in position, I could place no time limit. I leave the tube in position as long as there is no contraindication. The tube should only act as a support and is not intended to make pressure; however, if there is much swelling it is either due to inflammatory action or else the septum has not been sufficiently broken up and the swelling is due to pressure. Within twenty-four or forty-eight hours you may have to take out the tube on account of inflammatory swelling. There is usually some rise of temperature while the tube remains in position. This

is not necessarily due to any infection. Where the columnar cartilage is split, causing bulging in one nostril, I simply dissect up the mucous membrane and take out a portion of the cartilage.

Dr. PRICE BROWN, Toronto: Mr. President and Gentlemen:— A number of questions have been asked in regard to cleansing. I have the patients return regularly to my office. I have not time to cleanse them several times a day myself, but I cleanse them once a day and have the patient do it once a day. Although the splints are large enough to cover the parts operated upon they are narrow and do not occupy all the space. You can spray above them. The rubber splint fits snugly and you can place it in, so that you can spray through the anterior meatus to the back of the splint without difficulty. As to the weight of the splints, I have heard of no difficulty from their weight. There is a little oppression for two or three days and then there is no trouble. As to removing the splint: By removing the splint too soon you produce great irritation. And then if you have the perforated metal splints, they are simply filled by mucus. In regard to the substance I use for cleansing the passages, I do not use alkaline sprays at all but simply albolene or other hydrocarbon oil, which are aseptic and much less likely to cause congestion. If the parts are so close that you cannot use the spray. I use cocaine in a weak solution first and then one of the sprays afterwards. They are much better, I think, than the water sprays. As to having the sides of the metal splint perforated, that is not necessary. There should be no rise of temperature. The irritation you have in removing the splint early does not occur when you leave the splint in several days. Then when you take it out the patient will not complain at all. In one case I had to give the patient an anesthetic to remove the splint on the second day, while in the case of a child in which the splint was left in ten days there was no difficulty whatever in removing it.

As to operation on the vomer, very few cases require operation. Wherever you have a curvature you have a ridge formation, and if you remove that you very rarely need to break the septum. Suppose the vomer is considerably curved so you have difficulty in getting a full-sized passage, then I would operate and remove a portion of the inferior turbinated, so that by cutting the ridge from the vomer and removing a slip from the inferior turbinated you have an open chink. You will not find it necessary in many cases, at least, to do a capital operation on the vomer itself.

PAPER:

REPORT OF A CASE IN WHICH DEFECTIVE SPEECH RESULTS IN SOME INTERESTING DERANGEMENTS OF CEREBRAL FUNCTIONS.

BY G. HUDSON MAKUEN, M.D.

The patient is a lad, fifteen years of age, of American birth and Irish parentage. He is the youngest of four children, all the others being normal. There is no family history of consumption or nervous affection of any kind. When the boy was fourteen months old he had convulsions, followed by a severe and prolonged attack of meningitis. Full particulars of this illness cannot be obtained. He is of a somewhat nervous disposition and exceedingly bright and shrewd in many respects. An examination of the nose and throat reveals nothing that may throw light upon the cause of his trouble. His hearing is good and except for letters and words, he has normal vision. His nasal respiration is now free, but there is a history of some obstruction in the nose during childhood.

The two central and the two lateral incisor teeth have been lost by decay, although the other teeth are in good condition. The tongue is structurally normal or nearly so, but its motor functions are very defective. As he protruded the tongue, he could point the tip in only one direction, namely, straight out, perpendicular to the body. He had no power to draw the tip downward or upward or in either lateral direction. It is interesting to note that his father also is unable to point the tongue upward toward the nose.

The muscular control of the lips also was defective, and some of the movements necessary for the formation of words were either imperfectly made or altogether omitted. These limited and faulty movements of the tongue and lips resulted in a defective utterance of many syllables and words of mutilated speech which was very difficult to understand. Of the forty elementary sounds in the English language, there were only five that he could not repeat from dictation. For each of these five he substituted another sound, as follows: for V and R, N; for G, D; for TH, soft, as in "thin," F; for TH, hard, as in "then," LTH. These substitutions, however, do not represent the extent of his speech

mutilations, for in conversation there were many faulty combinations and he omitted some sounds altogether.

There was a lack of confidence in himself and a general slovenliness of utterance that rendered his speech very difficult to understand. He recognized his own deficiency more than is usual in these cases. He knew that his articulation was defective, but he had no power to correct it, nor did he seem to have much desire to do so. The feeling that his speech was different from that of other children made him loath to enter into conversation. He was sensitive and in constant dread of being laughed at by his schoolmates. This sensitiveness is perhaps the greatest hindrance to improvement of speech in defective children. They all do one of two things. They either go into a kind of seclusion and refuse to make any effort toward development or they become flippant and mischievous. The child who has been made the butt of fun by his mates soon learns that it is pleasanter to try to be humorous than to be serious, for he knows that he will probably be laughed at in either case. Those in the first class grow discouraged and despair of ever being like other children. So morbid do they become that it is not an unusual thing for them to absolutely refuse to try to speak at all. For such children, the average school is probably the least to be desired place because the contrast betwen them and normal children is brought out so strongly that it adds to their discouragement and therefore does more harm than good.

The patient under discussion was of the second class. The humorous side of his nature was abnormally developed. He saw only fun in everything and refused to be serious. This peculiarity of his nature made him very popular with his playmates, but his arrested mental development made him companionable only to children of less advanced age. Although he has been at school for about six years, he has made but little progress in anything except arithmetic, for which he showed considerable aptness. His teacher informs me that he had special trouble with everything in which the use of letters and words was required. He was unable oftentimes to read the simplest words and he could not remember the names of letters and words that he had learned, nor could he write words from dictation.

His writing was about on a par with his speech; his spelling of words was very defective and had very little similarity to his pronunciation of them. He was more proficient in the use of figures and he had no trouble in learning to read and write them.

Arithmetic was his favorite study; indeed, it was the only one to which he could be persuaded to give much attention. Instead of applying himself to his own task, he would listen to another recite or play with something or tease some one. Even though he knew the answer to a question, he could hardly be persuaded to try to give it, but would look at the other boys and laugh. He was quick to understand spoken words and there were other evidences of considerable intellectuality. He could do problems in mental arithmetic with some dexterity and his reasoning powers were good. He was by no means feeble-minded, but there was manifestly some functional impairment in the action of the cortical visual word center, resulting in partial word blindness.

Two somewhat singular cases have been reported; one by W. Pringle Morgan, in 1896, which he calls congenital word blindness. This case was fourteen years of age and to use the writer's own words, "He has been at school or under tutors since he was seven years old and the greatest efforts have been made to teach him to read, but in spite of this persistent training, he can only with difficulty spell out words of one syllable. . . . Words written or printed seem to convey no impression to his mind and it is only after laborious spelling them out that he is able by the sound of the letters to discover their import."

The second case was reported by H. Charlton Bastian, in 1898. The patient was a male, eighteen years of age, with no history of family taint or severe illness except whooping-cough during childhood. He was very slow in learning to read. Arithmetic gave him little trouble unless he had to write out the problems. His memory for words was very defective, but for things and for what people had said, it was excellent. His speech was fairly good and he only occasionally used wrong words.

I may be noted that these three cases are boys; fourteen, eighteen, and fifteen years of age respectively. They all have good family histories and present a considerable amount of intelligence; they were given opportunities for education, although mathematics was the only branch in which they made much progress. They all had great difficulty in learning and retaining the names of letters and in learning to read words and to write them from dictation. In Morgan's cases there was no illness or injury of any kind; in Bastian's there was a history of whooping-cough; and in mine, of convulsions, followed by what his father called "brain fever," at the age of fourteen months. Unfortunately, as I have said, the details of the illness were meager.

All three cases present symptoms of word blindness. Morgan called his congenital word blindness because there was no history of its having been acquired. Bastian does not give his a name, but he says, "It happens occasionally that the visual word center is either congenitally weak or else has undergone some damage in early childhood, in consequence of which its activity is lowered," and then proceeds to cite his case as an illustration of this fact.

In my case, we have a definite, though unsatisfactory, history of an acute brain affection in infancy and it is quite possible that the disturbance in the visual word center may be due to a direct damage to that portion of the brain, resulting from this illness; but it is more probable that it was secondary to some disturbance in the motor tracts, rendering among other things the development of speech impossible. This view is strengthened by the fact that a little special training of the motor centers has not only greatly improved his speech, but has increased his capacity for recognizing and retaining the visual impressions of words.

It is well known that when for any reason the development of the faculty for speech is delayed, there is a corresponding lack of functional activity in both the visual and auditory word centers, as well as in those related areas of the brain employed in the use of language and thought. So great is the dependence of the functional activity of these special centers and their related areas upon the use of the faculty of speech that its lack of development, due entirely to mechanical obstructions in the peripheral organs, has in some cases led to a diagnosis of imbecility and even idiocy.

One of my first published cases of defective speech was supposed by his family physician to be an imbecile, but after a slight operation on his tongue and a short course of training, he developed not only good speech, but also exceptionally strong mental powers and he is now studying law successfully in Philadelphia. His inability to use speech resulted in functional derangements of cerebration that were mistaken for incurable organic defects. Indeed, it is frequently impossible to determine offhand whether the defective cerebration be of functional or organic origin; and the only means of making the differential diagnosis is probably the employment of a course of systematic speech training. This may be regarded as a specific treatment for all those purely functional disorders of the brain in which defective speech is a prominent symptom, whereas in cases having organic lesions its value may be limited. The special training of

the subject of this paper has been in progress for only a few weeks and yet the improvement has been little short of marvelous; and there is every reason to believe that with continuation of the treatment, there will eventually be no trace of any defect, physical or mental.

His teacher writes me, "John is considerably better; his memory particularly is improved. While in arithmetic he is about the same, he learns his other lessons much more easily and retains them after he has learned them. In his reading he recognizes words and the letters and sounds of which they are composed more readily and has not the same trouble in pronouncing them. He is by no means so restless in school as he was and he takes much more interest in his lessons." This case would seem to illustrate the importance of special training as a remedial agent in certain forms of feeble mentality characterized by defective speech and other motor disturbances.

DISCUSSION.

Dr. Geo. L. Richards, Fall River: Mr. President:—Perhaps a good many of us do not know enough about the subject to discuss it intelligently. I remember hearing another paper by Dr. Makuen, at Philadelphia two years ago, at which time he exhibited two or three children, with whom he had had some remarkable results, and I have wished a good many times that I could show him some cases that have come under my own observation in which I have had anything but satisfactory results. We would get them to a school for the feeble minded and I would lose sight of them. It is difficult to get any one with intelligence to teach these children the way they ought to be taught. I would like to ask Dr. Makuen the history of the two cases he presented at Philadelphia, and some of the methods in the everyday teaching of these cases.

Dr. H. Holbrook Curtis, New York: Mr. Chairman:—This paper is certainly of great interest to me, but I feel, as I know many of us do, that we are not neurologists enough to discuss it ably. In the cases recorded there was evidently an impairment of the visual centers and of the motor centers or the motor fibers of articulate speech. I would like to ask the Doctor if he believes that the kinasthetic centers are disturbed. It would strike one that both the visual and articulate word memory was affected, so there must have been, aside from the affection of the motor tracts of articulation a want of coördination between the kinesthetic centers and the motor area of articulation.

Dr. G. Hudson Makuen: I appreciate your courtesy in allowing me to read my paper at this time and also to enter further upon the discussion of the subject. In regard to the methods

used in the training of these cases of defective speech, I may say that it does require a great deal of patience. The ordinary elocution teacher is not satisfactory and I have found it necessary to first train my teacher. We should approach these cases in a scientific spirit, as we approach other patients. We should endeavor, first of all, to discover the cause of their defect and then to remove it, if possible. Reference has been made to some cases that I showed in Philadelphia two years ago. One stammered for nearly thirty years, but she is now entirely free from any speech hesitation whatever and is trying to free others from the defect with which she was afflicted for so many years. Her success in obtaining relief may be traced to the fact that she carried out the suggestions given her, even to the minutest details, and thus she was enabled to acquire perfect voluntary control of the organs of speech. The young man whom I showed in Philadelphia is also doing well, although he informs me that at times he must be on his guard to keep from some slight hesitation in speech.

Dr. Curtis has referred to what Bastian calls the "kinesthetic centers of the brain." These are the centers in which are stored the memories of the expression of language. In the case I have referred to in my paper, the kinesthetic centers recorded accurately the forms of expression employed. These forms, as I have shown, were faulty and they were recorded as being faulty. When the proper forms of expression began to be acquired, there seemed to be no difficulty in acquiring also the memories of these forms, either for spoken or written language. Therefore it would seem that there could have been little, if any, disturbance in these centers. The trouble was in the visual word center. He was word-blind and letter-blind. He could not recall letters because he never used them for the formation of words. When he learned to say words and letters and appreciate their meaning, he had no difficulty in learning to recall them.

Through the courtesy of Dr. Thorner, I am permitted to show you our mutual patient, John L., whom I now see for the first time in two years. This young man had what may be called an aspirated falsetto voice. It was a mixture of breath with the falsetto quality of voice and it presented a very peculiar combination. For several years he was an object of curiosity and often of derision to those who heard him talk. He had consulted many physicians and teachers, but had received no help whatever. The ordinary methods, such as dropping the jaw and trying to imitate the sound "Ah," given in a low tone, proved unavailing. My treatment consisted in the development of the depressor muscles of the larynx. I observed that in speaking he always drew the larynx high up beneath his tongue and away from its normal position against the vertebral column. He was taught to hold the larynx down by means of the voluntary contraction of the sterno-hyoid, sterno-thyroid, and omo-hyoid muscles. When he had learned to hold the larynx in its normal position,

the voice immediately assumed its natural quality, such as I shall now ask him to use in your hearing. (Here followed a demonstration of his improved methods of speech.)

PAPER:

RHINEDEMA.

BY H. HOLBROOK CURTIS, M.D.

In none of the works on the nose and throat do I find mention made of nasal edema or dropsy, though I have encountered several well-marked cases clinically, where an undoubted edema has existed for a very long time, and has given rise to such severe manifestations that it seems warrantable to dignify the affection by a name, as has been done where an edema exists in other parts of the body, as ansarca, ascites, hydrops oculi, pulmonary edema, hydrocele, hydrocephalus, etc.. As regards the etiology of nasal dropsy, we must admit that the causation is more obscure than that of cardiac or renal dropsy. Ranvier has shown that ligation of the vena cava of a dog does not usually produce any edema of the extremities, but if one sciatic nerve is divided the limb on that side becomes at once edematous, the explanation being that as long as the nerve is intact the lymphatics are able to absorb all the fluid which exudes from the capillaries, but when the nerve is divided the arteries dilate and pour out more fluid than the lymphatics are able to absorb, hence the edema. This edema is not due to paralysis of the limb, but to paralysis of the vessels, for when the vasomotor fibers which supply the sciatic are cut edema takes place without paralysis; but if the motor strands of the sacral plexus are cut before they are joined by the sympathetic fibers, we find a paralysis without edema. We may analogously regard the edema occurring in the nose as a vasomotor phenomenon either due to a paresis brought about by overexcitation of the vasomotor nerves or to a direct injury to the nerves themselves, either by pressure or disease.

If we had only this causation of edema our task would be simple. We know edema to be caused locally where impeded venous return causes a dilatation of the arteries, and also where the arteries are dilated by other causes without venous obstruc-

tion. Winniwarter has shown that vessels in an inflamed part are more permeable than in healthy tissue, as instanced by the infiltrated welt in scratching an urticaria.

Again, local edemas are caused by anemia. We are all familiar with the general dropsies of the kidney and heart. In the kidney those diseases which have most albuminuria are productive of most dropsy, usually first evidenced in the eyelids.

Cardiac dropsy from regurgitation generally appears first in the feet. Local edemas about certain inflamed joints and tissues, not dependent on cardiac or kidney lesions, are due to the dilatation of vessels in inflamed parts.

The habitual imbibition of large quantities of water is often productive of infiltration of the mucous membrane of the larynx and nose. A prominent judge of this city applied to me some years ago for recurring edema of the arytenoids, which I was able to trace to this cause. He made a practice of drinking two quarts of water during the night and much more through the day. No cardiac or renal disease existed, and he recovered by abstaining from water except in small quantity.

We must differentiate between a hyperplasia and a dropsy, and I am convinced that many cases of so-called winter hay fever are cases of true rhinedema. In this connection it might be well to review that ever-interesting subject, to discriminate between it and a dropsy of the nose.

Hay fever, for want of a better term, has probably resisted treatment more effectually than any of the nasal affections for which we are called upon to prescribe. The particular pollen which gives rise to the vasomotor phenomena in individual cases must be ascertained by a careful study, and only by a removal of the etiological factor for a number of years can we hope for a cure by climatic influences. (I will say in this connection that I am still experimenting with the immunizing extracts of flowers I reported a year ago.)

Three types of cases are to be considered, the anterior, the posterior, and general erectile irritations, which induce the stoppage of the meatus. The anterior tumefaction occurs sometimes independent of the posterior, and is characterized by intermittent excitation of the erectile tissues of both the inferior and middle turbinates anteriorly, with ofttimes a thickening of the tissues of the tubercle of the septum.

The posterior condition may obtain independently of the an-

terior, affecting only the erectile tissues on the posterior turbinate, or, again, a general hyperplasia may be present.

The emanations of certain animals, such as the cat, the mouse, the horse, etc., as well as certain vegetable pollens, may produce this tumefied condition. The exciting cause originates in all these cases from without, acting on a constitutionally susceptible membrane. In rhinedema we find on inspection a very similar condition, except that there is a general infiltration of the entire lining membrane of the nose; and this not dependent on any extraneous cause, such as pollen, but found at all seasons, and in patients of every station in life. The tissues are more spongy and pale, with a bluish tint; the entire nose is stopped; cocaine, ischemin, or any known agent does not cause contraction, the vasomotor paresis persists, and a true edema supervenes. In certain cases this lasts for months, the nostrils remaining impervious. The nervous system becomes greatly depressed; hysteria and melancholia sometimes follow. In one case encountered the mucous membrane broke down in ulcerated areas, both on the septum and turbinates. In other cases the nose becomes filled with a mucopurulent secretion, which cannot be removed except with a probe and cotton. The external nose becomes congested and swollen as the disease progresses, and the eyes become sympathetically affected. As a complication, late in the course of the affection, the accessory sinuses may become involved.

The distress experienced by a patient with edema is vastly in excess of that encountered in simple rhinitis vasomotor *periodica* (or hay fever). The absolute despair of the victim is at times pitiable, and the inability to afford even a temporary relief is discouraging to the physician.

This affection appears chiefly in neurotic women and men of sedentary habits, between the ages of thirty and fifty, and sometimes in youths of fifteen to nineteen. From a careful investigation of the latter class of cases, the conclusion arrived at has been that the disease is sometimes associated with sexual perversion, and the success of the treatment which is recommended rather confirms this hypothesis. Ofttimes, however, an edema is independent of the sympathetic nervous system, and is directly due to impeded circulation caused by pressure of new growths situated in the superior meatus, by hyperplasias, hypertrophies, and polypi. Ethmoiditis with caries in the vicinity of the sphenopalatine ganglia was found to be the cause in a case which had been considered a gouty nose. A constant symptom of rhine-

dema seems to be an intensified desire to breathe through the nose, amounting almost to mania.

Several patients have told me that, maddened by the inability to breathe, they have rushed upstairs to get some water or ice, and the awful tension was for a few seconds relaxed by the exertion.

In other cases the shock of a cold douche on the spine has served the same purpose when alternated with a hot one.

The fact that a change of climate does not as quickly relieve cases of this kind as a radical change of the *modus vivendi* has led me to institute a course of treatment or training which is rapidly productive of good. I insist that these patients go to a regular gymnasium or have a teacher come to them and give progressive gymnastic exercise to put them in a profuse sweat twice a day, after which they take a warm bath, followed by a cold shower or plunge and a brisk alcohol rub. They must keep in the open air. Usually I advise walking ten squares and back, increasing a square a day, an hour after breakfast and luncheon. In other cases I prescribe the Sandow physical exercises, of which there are twenty-eight, supposed to exercise every muscle in the body, these to be done on rising and before dinner. If this is carried out, going to a gymnasium is unnecessary.

Now I come to the most important step in treatment of this affection, and that is the use of the rectal sitz douche with the nozzle in the center of the cushion, by which the patient may wash the entire colon morning and night with four quarts of water in which is put a spoonful of sea salt and sodium bicarbonate. In no way can venous stasis in any part of the body be so quickly relieved, and, as a treatment to benefit the portal circulation, it has no equal as an adjunct to exercise.

This mode of treatment, with a little strychnine and digitalis, will soon put the nasal mucous membrane in condition to resist monochloracetic acid without danger of a general slough taking place. In these cases cauterizing the nose with electricity or acid in the early edematous condition is hazardous in the extreme. All edemas are not the result of venous stasis or impediments to the return current, and it is difficult to conceive that in the nose a true impeded return might be established. Much more reasonable is the hypothesis that altered nerve function or vascular disturbance caused by a neighboring ethmoiditis primarily induces the dilatation and infiltration, which soon partake of the characteristics of a true edema.

While I do not consider that rhinedema is a disease that may

be isolated as an affection *per se,* I advance the term as a satisfactory word to illustrate a condition often occuring, by means of which we may etymologically differentiate a true edema from the numerous varieties of rhinitis, under which term our nasal affections are perhaps unwisely classified.

DISCUSSION.

Dr. WENDELL C. PHILLIPS, New York: Mr. President:—I think that this paper is somewhat timely. While I question whether the term is necessary, there can be no doubt that many of our patients suffer from some diathesis which leads to a very great congestion of the nasal mucous membrane. I have come to regard it as the uric-acid diathesis. I have found that a great many patients, who suffer from temporary alternating nasal stenosis, are people who have a uric-acid diathesis. There was a time when I cauterized all these cases, which would relieve them for a few months and then they would come back with the same trouble. But I do not cauterize them any more for I have found a better way to treat them, by looking after the general condition and overcoming if possible the uric acid excess, at least that is what I call it. There is nothing in my practice more helpful than the internal administration of bicarbonate of soda, in cases that have acute inflammation of the nose sometimes extending to the larynx with loss of the voice or hoarseness. I first give them a dose of calomel and follow it with bicarbonate of soda. It is wonderful how you can abort these cases in this way. I give the patients gr. xv-xx bicarbonate of soda every hour for several hours. I think it is better to administer it gradually until they are under its influence. It is wonderful how the nose will open up under the administration of calomel and bicarbonate of soda. There are other alkalies that would work just as well, but this is what I use.

Dr. LEWIS C. CLINE, Indianapolis: Mr. President:—I want to endorse what the Doctor said in the discussion just now. Doses of Rochelle salts or small doses of calomel are almost specific in these cases. Instead of cauterizing them, I take an alkaline spray solution with a little carbolic acid in it, and give the nose a good thorough scrubbing, scouring as it were.

Dr. H. HOLBROOK CURTIS, New York: Mr. President:—It was exactly the spirit shown by the two speakers who discussed the paper, that led me to write the paper. We are not dealing with an inflammation of the nose in these cases. It shows exactly the way this has been taken and the necessity of the term I have originated, to emphasize the fact that edema and congestion are not the same thing. Edema must presuppose infiltration. You can have congestion or hyperplasia without edema. It was just that point I referred to in my paper, and I am glad it has been brought out in the discussion. I thank you very much.

PAPER:

EXTENSIVE THROMBOSIS OF THE LATERAL SINUS AND INTERNAL JUGULAR VEIN, FOLLOWING ACUTE SUPPURATIVE OTITIS MEDIA. LIGATION OF THE INTERNAL JUGULAR VEIN IN ITS LOWER PORTION. SECONDARY PERI-PHLEBITIS. RECOVERY.

BY M. D. LEDERMAN, M.D.

Recent observations in a few complicated cases of suppurative middle ear disease, conclusively prove to me that external manifestations are no criterion to the extent of existing disease. Local symptoms, no doubt, augment the possibility of the presence of a pathological process, but the absence of these symptoms does not warrant the assumption that a diseased state can be ignored.

To corroborate this line of reasoning, we need but recall to mind those cases of extensive disease of the mastoid that offer no other indication than an occasional attack of aural discharge; probably incited by a catarrhal exacerbation. The destruction of the osseous tissue goes on so insidiously that no discomfort is experienced by the patient until an acute change brings its disturbing influence.

In those mastoids, where the cortex is unusually condensed, the suppurative invasion is forced to find an exit through the paths of lesser resistance.. Cases of Bezold's mastoiditis have been reported in which no lesions were observed in the canal or middle ear, and yet considerable disease was found in the mastoid itself. Only recently, in operating for an acute mastoid, I found an external opening on the posterior border of the mastoid, in a direct diagonal line from the antrum, three-quarters of an inch below its level. The posterior cells were much involved, while the anterior cells and tip were but slightly affected.

In children it is not unusual to find the mastoid perforated high up, thus permitting the pus to find its way through the fascia and muscles of this region until it appears above and in front of the auricle.

To further illustrate how uncertain the path of the pyogenic

factor may prove to be, we need only recall those serious forms of complications, (*a*) where the disease extends to the lateral sinus by way of its bony boundaries (which course it probably took in my case): (*b*) where the middle cerebral fossa is attacked through the tegmen tympani; or (*c*) into the posterior cerebral fossa through a fistulous tract.

The early detection of pus in acute disease of the middle ear is most important. Here the infectious process extends very rapidity, and unless promptly checked, it may reach beyond the limits of successful surgery. This practical fact was vividly brought to my attention in the case which I herewith report.

Julia La F., 19 years of age, was seen for the first time at the Manhattan Eye and Ear Hospital, on December 25, 1898.

For some days before her admission she had pain in the right ear, and was treated by a physician who prescribed some medication in the forms of drops, together with hot douches. Perforation of the drum occurred and a free discharge was seen. Pain then extended over the entire head.

On the day of admission to the hospital, Dr. Martin, the senior house surgeon, noted the following condition:

The right ear was discharging freely, and the left membrane was red and bulging. The girl had severe pain in both ears, over both mastoid and back of head. Dr. Martin incised left drum, ordered hot douches continued and ice coil to mastoids. Temperature was 101½° F., pulse 108. Calomel was given internally until a decided effect resulted.

The patient passed a poor night, complaining of pain in mastoid. This symptom was promptly relieved by reapplying the ice coil. Temperature had been 104° F. at six o'clock, December 27th, but fell to 99.8° F. The mastoid tenderness became less but did not disappear entirely. The discharge from the right ear diminished in quantity, while no pus was noticed in the left canal. Variations of temperature occurred, and the opening in the right drum was enlarged, which was followed by an increased flow of pus and a gradual subsidence of the elevated temperature. About this time difficulty in swallowing was experienced, as if resulting from a tonsillitis. On examination, the right faucial space was found injected, but no definite lesion was observed. Pressure along the sternomastoid muscle showed tenderness, though no "cord-like feeling" could be discovered.

On January 1st the patient had her first and only chill, which

was followed by a rise of temperature to 104.8° F.; pulse 152. The condition improved somewhat during the following days.

An examination of the eyes revealed some tortuosity of the retinal veins, and a stiffness of the right shoulder and arm was noticed by the house surgeon. The girl was inclined to somnolency, though responding readily to conversation. As tenderness along the sternomastoid still persisted, an operation was advised without further delay.

On January 5, 1899, the usual Schwartz opening was attempted, but after the second chip of bone was removed, a non-pulsating grayish-blue membrane appeared, which proved to be the sinus unusually superficial and anterior. At first it was thought to be the thickened lining of a large cell, but after removing the bony boundaries, its identity was distinctly recognized. Finding some pus in the mastoid tip, this portion together with the bony covering of the sinus was removed until the jugular bulb was reached. Posteriorly the sinus was exposed for an inch.

No pulsation could be seen, so a small aspirating needle fitted to a hypodermic syringe was introduced into the middle portion of the exposed sinus, and a barrelful of fluid pus was withdrawn. This evidence was followed by an incision through the upper wall for three-quarters of an inch in length. From this opening considerable pus escaped. No blood appeared until some degenerated thrombus was removed from the posterior portion of the sinus by means of a small wire curette. This instrument was introduced for fully an inch before a free flow of blood showed that the channel was cleared in this direction. A strip of iodoform gauze was used as a plug after sufficient bleeding had occurred. The curette was then applied at the other end of the sinus opening. Though quite a quantity of thrombus was removed in this manner from the region of the jugular bulb, no free blood flowed.

Realizing the seriousness of prolonged jugular thrombosis, I proceeded at once to tie the internal jugular vein as low down as feasible. The ligation was performed an inch above the clavicle. Some difficulty was experienced in reaching the vein, as it was very deeply situated. It was found external and somewhat behind the artery. No pulsation was visible in the vein. Two ligatures were placed around the vessel and the lowest one was tied securely. The upper ligature was applied in case of emergency, but was not tied.

No attempt to dissect out the vein was made. On cutting

into the vessel, pus escaped, so the vein was severed completely above the tied ligature, and brought out of the neck wound.

Was not successful in my effort to flush out the jugular obstruction with the syringe through the mastoid opening, but did accomplish my object very satisfactorily by introducing the nozzle of the syringe into the cut off end of the vein below and syringing upwards. With but little pressure on the syringe, a long fibrinous mass came through the mastoid end of the vein, followed by some purulent fluid. After the second syringeful of boric acid solution, the fluid came away clear, proving a patulous condition of the vein. Finding no evidence of further extension of the suppurative process around the vein, a small-caliber rubber catheter was introduced into the lumen of the jugular for a short distance, and the wound was dressed; the catheter being kept outside of the wound and surrounded with sterilized gauze. The mastoid wound was packed in the usual manner, with strips of gauze in both ends of the open sinus.

Though lasting over two hours, the anesthesia was well borne, and my patient rallied from the operation in an agreeable manner.

For the following four days the temperature did not rise above 101° F. The wounds were dressed on the fourth day, and appeared in a nice clean condition. Her general health was good. On January 9, 1899, swelling was noticed external to the neck wound. It was tender to pressure, but no fluctuation could be discovered. During the following week the temperature showed a tendency to rise and fall at irregular intervals. On January 16th, it reached 104° F. The tumefaction of the neck had extended below the clavicle and posteriorly to the outer margin of the platysma myoides muscle. The swelling was tender to the touch, but hard in consistency. No fluid could be detected, and no pointing was visible. The patient was again narcotized, and an exploratory incision was carried through the median area of what we thought was a cellulitis. No pus could be found though various paths were made with the groove director and probe. Owing to the establishment of the collateral circulation, a number of superficial and deep veins had to be ligated as they bled considerably, being greatly enlarged. A diagnosis of phlebitis was made. For the following two days a very profuse sero-sanguinolent fluid escaped from our second opening in the neck. The dressings were thoroughly saturated with the discharge.

On January 18th all the wounds were dressed and found very satisfactory, though the serous discharge still continued in great quantity. Dr. Dawbarn kindly saw the patient and suggested a wet dressing of a hot acetate of alum solution (saturated). This was applied for two days, but an unpleasant dermatitis set in, and the alum solution was discontinued. Plain sterilized gauze was then employed. Gradually the serous fluid subsided, and on January 23d we noticed that the cervical swelling was becoming less and our patient was progressing satisfactorily. During the following twenty-four hours the temperature did not rise above 99° F. From that date nothing interrupted a steady improvement, and my patient was permitted to sail for her home in Paris during the early part of March.

The points of interest in this unusual case are first, the rapidity and extent of the complicating factors in an acute suppurative otitis media; secondly, the anomalous position of the lateral sinus, which no doubt accounts for the marked thrombosis of the sinus and internal jugular vein; thirdly, the secondary peri-phlebitis with the profuse sero-sanguinolent discharge, fourthly, but one chill with all this collection of septic matter in the circulatory channels; and lastly and happily the patients ultimate recovery.

My experience in mastoid surgery warrants me in indorsing liberal incisions of the soft parts. They permit a satisfactory exposure of the bony structures and adjacent tissues, and augment the possibility of satisfactory technique.

PAPER:

PYEMIC SINUS THROMBOSIS COMPLICATING PURULENT MASTOIDITIS, WITH MULTIPLE EPIDURAL ABSCESS CAUSED BY AN ACUTE OTITIS MEDIA —OPERATION—RECOVERY.

J. F. M'KERNON, M.D.

C. S., aged fifty-six years, native of Sweden, was referred to me by Dr. Joseph A. Kenefick, July 25, 1898, giving a history as follows:

Had always been in good health, with the exception of an attack of smallpox in 1874 and an attack of acute gastritis in 1893.

He said ten weeks before, after three operations on the left nostril for the removal of polypi, he suffered an attack of facial erysipelas, which lasted two weeks. One week later there was intense pain in his left ear, which continued for four days, and was so severe that it prevented him from obtaining any sleep. At the expiration of this time the drum membrane ruptured, a discharge of pus followed, and the pain was somewhat relieved for two days. On the third day after the rupture of the drum, pain began again and continued at irregular intervals for the next five days, but it was not so severe that he could not sleep part of each night.

Nine days after the ear pain began he experienced pain in front of his left ear, and the next day a swelling developed, gradually encroaching upon the left cheek. Leeches were applied to this swelling in front of the ear, followed by the application of a hot-water bag, and some relief from the pain was obtained. For ten days before he came under my care, he complained of almost constant pain over the left side of the head. Since coming under Dr. Kenefick's care, irrigation of the canal with bichloride 1-4000 was practised every three hours.

Upon examination of the ear a profuse purulent discharge was found coming from the left external auditory meatus, and upon wiping this away, to inspect the deeper structures of the canal, nothing could be seen save a prolapse of the superior and posterior canal walls, which looked red and edematous. In front of the the tragus was an irregular swelling, covering nearly the whole

of the left cheek, and extending downward below the angle of the jaw, which swelling was an enlarged parotid gland with inflammatory tissues surrounding it.

This was extremely tender under pressure and edematous over its central and lower half. There was marked tenderness over the mastoid antrum, and at the tip. There was also a fulness of the tissues above and back of the ear corresponding to the temporal ridge, but no tenderness was found upon pressure. There was, however, marked tenderness upon pressure over the left side of the head, particularly over the middle fossa. His temperature registered 100.8° F., pulse 86. The tongue was furred, the breath bad, with a slight odor, and he was intensely nervous.

The discharge from the canal was examined and found to contain streptococci in abundance; also, a large number of staphylococci was present. A diagnosis of purulent mastoiditis was made and opening the mastoid was advised without delay, but this was objected to, the patient saying he felt better now than at any time during the past week. Again the advice received, he went into the country that afternoon, but returned the next day, saying he had had a bad night, with pain in the left ear and headache on the same side, and thought he would remain in the city for a day or two and see how he felt.

He was advised to take a room at the hospital and have an operation that day. He consented to go into the hospital, but as he had heard of ear trouble being stopped by ice bags and various medicaments he insisted that this be tried first. He was put to bed, a free incision was made in the prolapsed canal wall, the bowels thoroughly evacuated, an ice coil applied, not, however, with any hope that it would help the disease, but because something had to be done, and the canal was irrigated with bichloride 1-4000 every two hours.

The next day, July 27th, he felt very comfortable, and said he was sure no operation would be necessary; temperature 100, pulse 74.

The coil was removed that evening, and he passed a restless night, complaining of headache and ear pain continually. The discharge was now very profuse, a greater tenderness existing over the mastoid than heretofore, with slight edema just anterior to the position of the mastoid antrum. The patient was told he could submit to an operation or he would be discharged, as no more responsibility would be accepted unless an immediate

operation was consented to. He reluctantly gave his permission, and as the urine was negative he was taken to the operating room.

Operation.—Ether was administered, and, assisted by Dr. Kenefick, the usual curvilinear incision over the mastoid was made from the tip to a point one inch above the posterior root of the zygoma, through the soft tissues and periosteum to the bone. The periosteum, which was easily detachable, was retracted backward, the auricle forward, and the surface of the mastoid exposed, which was dark in color and prominent as to size, showing a well-marked supra-meatal spine. Upon opening the antrum an abundance of creamy pus flowed freely outward. The antrum was cleansed of the pus and some granulation tissue, and free communication established through the auditus with the middle ear. The cortex, which was softened, was removed with a rongeur, exposing the cellular mastoid spaces, all of which were filled with pus. The intercellular bone was very dark in color, and found to be soft and necrosed. The cells were obliterated and the inner table found wanting over a considerable area, showing the dura covered with necrotic granulations and bathed in pus. Large medullary spaces were discovered extending back into the occipital bone. On account of this, it became necessary to make an incision backward through the soft part, at right angles to the former incision, for a distance of two inches, in order that the softened cortex might be further removed, and the medullary spaces be reached and obliterated. The bony wall between the antrum and middle fossa was softened and necrotic, and upon removing this, pus, creamy in character, came from the dura, where it had become walled off after its penetration through the bone tissue below.

The sigmoid groove was removed and in working backward and downward, posterior to the knee of the sinus, the curette passed easily through the bony wall, and before it could be withdrawn, pus, rather dark in color, came through the opening just made. This opening was enlarged, and all softened tissue removed for an area of over an inch. The dura was darker in color than normal and covered with granulations, which were removed with the aid of a dull curette and thumb forceps.

In removing the softened bone over that portion of the sigmoid sinus above the knee the rongeur was used, and in biting off a small piece of bone a softened and diseased section of the sinus wall, about half as large as the little finger-nail, tore away, adhering to the under surface of the bone. This caused trouble-

some hemorrhage for a moment, but was soon controlled by packing iodoform gauze over and against the opening.

The further removal of necrotic bone, granulations and pus was continued with, until the entire apophysis was taken away, and a considerable area of the occipital bone as well. As the blood current within the sinus seemed normal at the time of its accidental opening, no further exploration was deemed necessary here. The wound surface was irrigated with bichloride and packed with iodoform gauze in the following manner:

A single piece was put over the puncture in the sinus and separate pieces were used for each exposed portion of the dura, thus walling off from infection each individual part from the general mastoid cavity, which was firmly packed together with a single piece, carried through the aditus to the middle ear, the usual dressing was applied, and the patient was returned to his room in very good condition, and passed a comfortable night.

The following day his temperature was 102° F., pulse 86, and, though weak, he said he felt better than for seven weeks previous. On account of the weakened condition of the pulse he was given by mouth one-thirtieth of a grain of strychnia at 12 M. At 2 P.M. he felt slightly nauseated and attributed it to the tablet of strychnia he had taken. The tablet was discontinued, and save for a slight headache over the left side he passed a comfortable day and night.

July 30th, two days after the operation, the temperature was 99.2, pulse 82, the bowels were moved, and he took the ordinary nourishment of milk, broth, etc. That night he complained of pain in both ears, and insisted that he was going to have just the same form of trouble in the right ear as in the left. Upon examining the right ear and reporting it negative he went to sleep and passed a good night.

Next day his temperature was 99.6, and he complained of considerable pain in the wound region; was disinclined to take food and was nervous and fretful. In the afternoon, while still complaining of pain in the wound, the dressing was removed in its entirety, except over the opening in the sinus, and all the parts found to be healthy. The parotid gland was greatly reduced in size and had lost much of its angry look and tenderness. The uncovered portion of the sinus on either side of the gauze, covering the opening, was examined and appeared normal. The wound was redressed, and during the remainder of the day and that night he rested very comfortably.

The next day, August 1st, his temperature was 100.2, pulse 88, and rather compressible. In the evening he complained again of head pains, and asked to have an ice cap applied, which was done, and he soon went to sleep and rested well until morning. That day, August 2d, his temperature in the morning was 100, pulse 94, tongue furred, bad odor from breath, and he felt a disinclination for food of any kind. Toward evening he felt nauseated, but did not vomit, and seemed rather dull and apathetic. The evening temperature was 101, pulse 100, and he passed a restless night. Next morning the temperature was 101.4, pulse 98. He was very dull in the morning, and would sleep at intervals, then start up suddenly and want to get out of bed and sit up. At noon he complained of a dull pain all along his spinal column, extending to the top of his head. In the afternoon he became very restless, his temperature reaching 102.8, pulse 105, and again complained of nausea. At 10:30 in the evening he vomited a small quantity of greenish looking mucus. After this he became exceedingly restless, and his temperature rose to 103.4, pulse 120 and weak.

I was sent for by the house surgeon, and advised the patient's wife, who was present, that it would be necessary to operate as soon as possible, as I believed we had an infected thrombus to deal with. She requested that the operation be postponed until morning, which was done, and during the remainder of the night he twice vomited mucus, of the same character as before, felt chilly, was at times delirious, insisted on sitting up, and was exceedingly restless.

In the morning there was a marked change for the worse in his condition. His temperature was slowly rising, and at 8 A.M. it had reached 104.2, pulse 130 and weak, tongue very dry and heavily furred, and the skin which before had been normal in color, was of a yellowish tinge, and he was in a partially unconscious state. There was also some slight tenderness along the upper part of the internal jugular in the neck.

His wife now consented to the operation, and a hypodermic of one-thirtieth of a grain of strychnine was given and he was taken to the operating room.

Second Operation.—Ether was again administered, dressings entirely removed from the wound surface, and the field of operation cleansed with bichloride and later with hydrogen peroxide, full strength. The portion of the sinus which was exposed at the

former operation was seen to be of a dark green color, and felt soft to the touch.

The sinus was aspirated with negative result, and was now rapidly uncovered, an incision being made in the soft part directly backward and the flaps retracted above and below, so as to further facilitate exposure of the sinus. The bone over the sinus was removed toward the torcular for a distance of two inches, and below, down to the jugular bulb. A linear incision was now made throughout the whole length of the exposed sinus wall from the point uncovered above, to the bulb, and at once pus oozed from the lower half of the lumen of the blood channel. The upper part was occupied by a partially disintegrated clot, together with granulations and some pus. This space from end to end was cleansed of its contents and hemorrhage, which was let flow for a few seconds, established from the proximal end, so that in case any septic material was present it would be carried out and away by the flow. A piece of iodoform gauze was placed against the opening to control the hemorrhage. The part below was again cleansed, and the posterior sinal wall examined in the region of the cerebellum, but save for a slight amount of discoloration it appeared normal.

An attempt was now made to establish the current below at the bulb. This was found to be more difficult than above, but by using a very small wire curette the flow was here also established and gauze packed into the bulb to control the return flow.

During the operation the several sites of exposed dura were kept covered with folded pieces of gauze, so as not to reinfect these areas. After again irrigating the exposed surface, the wound was packed with iodoform gauze in the manner above described, and a bandage applied, and the patient taken to his room.

During the operation the pulse became very weak several times and hypodermic injections of strychnine were used three times, one-thirtieth of a grain each time.

Upon reaching his room the pulse became very weak and he seemed on the verge of complete collapse. The foot of the bed was elevated and a rectal injection of a normal salt solution, one quart, at a temperature of 116° F., was thrown into the rectum and held there by means of an assistant with a compress. Several hypodermics of brandy were quickly injected and external heat applied by means of hot-water bags and bottles. Under this

treatment he rallied somewhat for a few minutes, but the pulse remained very rapid and weak.

Arrangements were at once made to transfuse him with a normal salt solution, but, in the few minutes, while this was being prepared, he rallied, the pulse becoming stronger and the skin a better color.

In two hours another rectal injection of a normal salt solution was used at the same temperature, and from this time on the pulse remained fairly good.

Six hours after his removal from the operating room the temperature was 99.3, pulse 116, respiration 30. He complained of a sharp pain in the back, in the kidney region, and hot flaxseed poultices were at once applied and kept up continuously for twenty hours. During this time he voided urine twice, was rather restless, and vomited a little mucus. Iced brandy was given by the mouth, but after taking it once or twice he refused more, saying it nauseated him.

As he had always been accustomed to drinking Irish whiskey when he was well, this was ordered to alternate with small doses of champagne every hour. Later he refused the champagne, on the same ground as the brandy, but kept to the whiskey, which he semed to thrive on, and throughout the whole of his convalescence this was the only stimulant he could retain.

The night following the operation he slept about five hours at thirty-minute intervals, perspired quite freely, and in the morning said he felt rested.

Twenty-four hours after the second operation the temperature was 99, pulse 94, skin moist and he was perfectly rational when aroused, but did not want to answer questions. That evening he again complained of nausea, and at 11 P.M. said he felt very chilly, was restless, muttered to himself at intervals, and the temperature rose to 100.6, pulse 110, and he slept but little during the remainder of the night, and then only about ten minutes at a time.

August 6th, two days after the operation, the dressings were removed and the wound surface found in good condition.

For the next four days the temperature ranged from 99 to 101, pulse from 86 to 112, weak at times, and in the early morning, between three and seven o'clock, would become irregular. Each night there would be mild delirium, lasting sometimes for fully four hours. During the day he would be drowsy, and always re-

fused to take nourishment, saying it made him sick at his stomach.

On the evening of the sixth day, after the operation, he felt chilly, complained of pain in the wound and pain in the back of the neck, and pressure over the internal jugular would cause him to wince, particularly high up near the mastoid wound.

The wound was dressed, and found to be looking well and healing nicely.

During the next three days the temperature ranged from 99 to 102.4, pulse 84 to 120. He did not rest well at night, and only for a few minutes at a time each day, was very thirsty, nervous, had twitching of the muscles of both arms, would have occasional coughing spells, with inclination to vomit after, and frequently complained of feeling chilly. At these times the skin would be warm, but there was absence of moisture. His breath now became fetid, the stools were very dark in color, with an extremely foul odor, and he complained of flatulence and distress over the abdomen. For this he was given dilute hydrochloric acid, ten drops, in Fairchild's essence of pepsin, after taking food.

The wound was again inspected and found doing well. For the next four days he continued in much the same way, the temperature fluctuating several times a day, but never going higher than 102.4.

The night of the 17th, thirteen days after the evacuation of the pus from the sinus, he had a decided chill, vomited, his temperature rose 103.4, pulse became weak, and he complained of violent pain in the abdomen. Thinking I had here to deal with a metastatic abscess, the colon was flushed with several quarts of a weak boric acid solution, and this was soon followed by ten copious movements of the bowels within the next four hours. The character of the movements was at first dark, stained with blood and mucus, with a distinctive fetid odor. Then changed in character to blood and muco-pus. He was at once put on large doses of the bichloride of mercury internally, one-twentieth of a grain every two hours, at first, and later one-twelfth every three hours, for twenty-four hours. He received stimulation and supporting nourishment, and the movements became less frequent, and in thirty-six hours ceased altogether, at which time the large dosage of bichloride was discontinued.

From this point on he made an uneventful recovery. The temperature dropped to normal and remained so, the pulse became stronger each day, he took more food, and there was ab-

sence of the nervousness, chilly feeling, and all the other bad symptoms. The wound was dressed every three or four days, and he was soon able to be up and about, and left the hospital on August 31st, one month and six days after his entrance.

At the present time the hearing on the side affected is normal.

There are several points of particular interest in this case to the writer.

First.—I wish to call attention to the development of the otitis and subsequently to the mastoiditis. That the acute otitis was direct result, by extension, of the erysipelatous inflammation, traveling through the Eustachian tube and thus infecting the middle ear, I think there can be no question of doubt, as the discharges from the ear and canal showed the streptococci present. It would be interesting to know if the erysipelas was the result of the operation on the man's nose, or if he became infected afterwards.

Second.—The very complete disintegration of the mastoid and the structures surrounding is, I think, accountable not alone to the length of time the disease existed, but to the virulence of the inflammation, as when streptococci exist in the discharges from the diseased ear we shall, I believe, always find a much greater amount of destruction than when they are absent.

Third.—*Was my wounding the sinus, at the mastoid operation, the cause of the subsequent thrombosis?* I believe it was. First, because the man did not show any evidence of a sinus involvement previous to the opening of the mastoid. Second, I believe from the condition of the sinus, both as to sight and palpation, while operating, that there was a normal blood current within. On the other hand, I have seen subsequent involvement of the sinus in a simple mastoid operation, when the sinus was not even exposed, but where there were streptococci in abundance in the pus from the canal of the affected ear, and from the pus that came from the mastoid antrum. So, if streptococci be present, the sinus is far more apt to be found involved, or to become so, than when they are absent. Cases confirmatory of this have been cited, where the sinus was uninvolved at the mastoid operation, but the pus from the middle ear and mastoid contained large numbers of streptococci, and later pyemic sinus thrombosis existed, with fatal results. Certainly, it becomes much easier for the micro-organism to enter the sinus if it find a gateway open, as in this case, than if it were not exposed, and for this reason I

think the accidental opening was in this case the cause of the thrombosis.

Fourth.—Was the removal of the granulations on the dura a contributing cause to the subsequent infection of the sinus? This may have been, as it is well known where granulations are present they act as a protection to the structures beneath them, and when once removed the free vascular supply to the part will cause a very rapid absorption to take place. However, in other cases, I have always removed the granulations when present, and there was no subsequent infection following.

Fifth.—Another feature of importance is, that in this case, for nearly ten days after the sinus was evacuated of its contents, the patient did not convalesce satisfactorily, and more than once it seemed that it would be necessary to do another operation, but after the metastatic deposit in the intestines had been evacuated, carrying away the major part of the poison in the system, he gained very rapidly, showing that we must take into consideration the fact that in such cases absorption of the infective material has been going on several hours, to say the least, previous to the operation, and it is not strange that with a system weakened from the disease it should take longer for elimination of the poisonous element to take place.

Sixth.—In this case we did not have any sudden rise of temperature. It was gradual throughout, with a steady rise up to the time the sinus was opened, and this fact alone was very misleading, and, I must confess, very perplexing at the time, when it came to the point of decision as to whether or not a thrombus existed.

DISCUSSION.

Dr. Wendell C. Phillips, New York: Mr. Chairman:—I think this paper by Dr. McKernon emphasizes the fact that when you have a purulent condition as extensive as it eventually was in this case, early and complete operation is the proper procedure. We all have had the experience Dr. McKernon had in this case, the great objection and hesitation of the patient to submit to operation. You cannot force a patient to submit to operation, but after a time I think the laity will come to recognize the importance of early operation in these cases, and I think it is the duty of the men who are doing active work along these lines, to do all they can to educate the laity to its importance. This can best be done through the general practitioner, for often he is the one who holds back the operation and it is through his influence oftentimes that the patient demands delay. Now, Dr.

McKernon in this case would have operated two or three days sooner than he did had he been allowed, and very likely an operation done two or three days sooner would have been an ordinary mastoid operation and the patient would have gone on to recovery. Now, if there is a possibility of the discovery of some means that will tell us just exactly at what stage to operate to prevent the development of the most serious condition, we shall have reached a most important goal. I think the time is coming when we will be able to make a very much more accurate diagnosis than we can at the present time.

Dr. Edward Fridenberg, New York: Mr. President:—Erysipelas of the anterior of the nose and its effect in producing otitis media is probably often overlooked. I think there are a great many cases of this intranasal erysipelas, where no symptom but slight pain is observed and it is only when it passes through the Eustachian tube and comes out in the ear, or on the face, that we make a diagnosis. So we probably often have erysipelas of the nose without it being recognized. One case I saw at the German Hospital after the Asch operation, when the house surgeon asked me to operate for acute mastoditis. The ear was painful, had discharged blood, and there was mastoid inflammation, apparently; actually, erysipelas had come out on the surface. The point raised by Dr. Phillips as to the exact time for operating, I think, will ultimately be decided in this way, that we will come to operate much earlier or in every case. We will take the ground that in the great majority of cases if there is any suspicion of the mastoid being involved, the patient will be better off with an operation, for in no case can the operation do harm. The cases of otitis media suppurativa, in my opinion, get well much sooner after operation than under any other form of treatment. In even a simple inflammation, that has not gone on to the formation of pus, the patient is relieved of pain and fever and there is less chance of there being any destruction or harm to the ordinary functions than with the ordinary treatment. But in cases where you have made the diagnosis of mastoid involvement, then we should insist upon immediate operation and not wait until the patient's condition is so alarming that we must operate merely to save life.

Dr. C. P. Linhart: Mr. President:—This paper brings to my memory a case that came to me a short time ago to consult me with reference to some middle ear trouble. The patient said that a short time before he had an acute attack of otitis media, first in one ear and in a couple of days in the other. In a few days he was attacked with pneumonia. The case occurred in a small town without any one to look after his ears and he let them break. The discharge continued for some time. His pneumonia took the usual course. He came to me during convalescence, to look after his ears. I thought it was probably an extension of the infection to the middle ear and possibly the same germs had been the cause in both diseases.

Dr. ARTHUR B. DUEL, New York: Mr. President:—I would like to say, from a bacteriological standpoint, that the examination of the pus to determine whether the staphylococcus or streptococcus is present, takes ordinarily from three to five minutes, not longer than that, and the cases where the streptococcus is present are much more rapid in progress than those in which we find the staphylococcus, which may be controlled often by the application of ice. I have found in almost every instance where the discharge from the middle ear contained only staphylococci and a free incision was made and free drainage secured, the cases were cut short in from twenty-four to forty-eight hours. The bacteriological examination is so short that I do not think it should be neglected in such cases.

Dr. E. B. DENCH, New York: Mr. President:—I should like to emphasize what the Doctor says, but the gentleman has taken all the air out of my sails. It is like the answer of the old whist player: "When in doubt, play trumps." Here, when you do not know what to do, it would be better to operate. Naturally the Doctor was hampered by the relatives, who would not permit operation. With all due recognition of the work of the men in the bacteriological laboratories, I think we are drifting too much in that direction. The principal thing is to determine whether you have pus, and not whether you have streptococci or staphylococci or pneumococci. You are in doubt of course. As the Doctor has said, if you find even healthy bone, the patient is not injured by operation.

The Chair: Do you mean an exploratory operation?

Dr. DENCH: Yes, sir; an exploratory operation where you are not certain.

The Chair: Upon what kind of symptoms would you think an exploratory operation advisable?

Dr. DENCH: A small amount of tenderness over the mastoid with disturbance of the middle ear, a bulging of the wall of the external auditory canal with profuse discharge or disturbance in the functions of the ear. A slight diminution in the discharge means that drainage through the external auditory canal is insufficient. An important symptom is the tenderness over the antrum.

Dr. ARTHUR B. DUEL, New York: Mr. President:—Reference has been made to a difference in virulence of the streptococcus and staphylococcus in mastoiditis. I believe in all cases where streptococci are found to be present in mastoid involvement, operation will not be delayed by the application of ice or any other application, on account of the rapidity with which the tissues break down under the influence of the streptococci.

Dr. E. B. DENCH, New York: The point I meant to impress was that even after we have the result of the bacteriological examination, we are not very much better off than we were before.

Dr. JAMES F. MCKERNON, New York: Mr. President:—In regard to the examination of the discharges, that is simply con-

firmatory of the diagnosis. If you have streptococci in the discharge and you have a decided, marked tenderness over the mastoid region, the bacteriological finding will be simply confirmatory evidence, which in my mind would cause me to go into the mastoid earlier than I otherwise would. This has been brought about simply by the frequent examination of cases under my observation and care. Dr. Duel very correctly says that the examination takes a few minutes only. There is a bacteriologist in the hospital every afternoon. A specimen of the discharge is taken when the patient is down-stairs and by the time we are ready to operate we have the bacteriological report. In the absence of the streptococci I often would not operate as early, but if I found evidence of pus there I would operate at any time. A case in point came under observation only last week. The case had been under the observation of a gentleman who had found tenderness over the mastoid and a slight discharge from the ear on that side. I found no more tenderness there, possibly, than upon the opposite side. The patient was 26 years of age, neurotic, and this last fact caused me to examine both sides, bringing out clearly that there was as much tenderness upon one side as upon the other. I had the discharge examined and found it swarming with streptococci. I do not think I should have operated upon this case so early had I not found the confirmatory evidence in the discharge. I operated soon after the report of the examination of the discharge was sent me. There was a regular empyema of the antrum. The sinus was exposed; the bone was softened, so portions of the dura as large as the little finger-nail were exposed. Regarding an exploratory operation in cases where only a slight amount of mastoid tenderness exists, I should not want to open the mastoid in these cases unless there was pretty positive evidence of mastoiditis. If we have pus in the antrum, open it by all means as soon as possible. But tenderness may remain for several days. It will pass away without one having to do a subsequent operation on the mastoid. So I would not be quite as positive as some of the gentlemen who have discussed the subject, in opening the mastoid as an exploratory means. If you have evidences of pus there, it is very well to operate. But as to the suggestion that you will cure otitis media often in that way, there are other means that are better and will not leave the scar or give the same discomfort to the patient.

PAPER:

TREATMENT OF SUPPURATION OF THE MIDDLE EAR WITH ACETANILID.

BY GEORGE F. LIBBY, M.D.

The following cases have been selected as fairly representing the results of the use of acetanilid in the treatment of suppuration of the middle ear in a series of seventy-five patients treated during the past three years. Fewer acute cases (3) are mentioned because of the greater tendency of the patients toward recovery.

Case I.—A. F. F., female, aged fifteen years, a student. Discharge from the right ear of three-weeks' duration, occurring one week after attack of grip. The hearing was entirely lost in this ear. The discharge was profuse, the pulsating vessels of the tympanum forcing it into the auditory canal at each heart-beat. The edge of the perforation in the membrana tympani was covered by granulations. These were removed with Hartmann's forceps, and their bases destroyed by applications of nitric acid. Each day for twelve days the ear was cleansed with hydrogen peroxid and carefully dried with absorbent cotton twisted on a probe, after which a small amount of finely powdered acetanilid was insufflated. On the thirteenth day the discharge ceased; on the following day the perforation was closed and hearing improved 10 per cent.; and after inflation of the middle ear twice a week for two more weeks the hearing was restored to normal.

Case II.—A. S. G., female, aged fifty years. Discharge from left ear for two days. Cleansed with hydrogen peroxid on cotton, dried, and insufflated acetanilid daily for five days. The discharge stopped on the sixth day and the membrane was healed on the ninth. Hearing of the affected ear improved 15 per cent.

Case III.—A. V. B., aged eleven months. Slight purulent discharge from left ear for six weeks. Cleansed the ear and insufflated acetanilid daily for three days. The discharge ceased on the fourth day, and the perforation closed immediately. Hearing not recorded on account of patient being an infant.

Of the chronic type I report seven cases.

Case I.—C. L., female, aged three years. Discharge from both ears for two years. Patient tuberculous and suffering from acute meningitis when seen by me in consultation with family

physician. Cleansed the ears with dry absorbent cotton and applied acetanilid daily for five days. The discharge, which was very free, stopped on the sixth day; recurred on the seventh in the right ear only; ceased on the ninth day and had not returned in either ear at last report, three months later. Hearing improved, per cent. not noted.

Case II.—E. M. W., male, aged twenty-one years. Occupation, clerk. Suppurative discharge from left ear of eighteen years' standing. The membrane was absent save a very narrow margin above, and the tympanum was covered with granulations. The discharge was very foul. Cleansed the ear daily with hydrogen peroxid and made occasional applications of a one- or two-per-cent. solution of nitrate of silver and finally of lunar caustic until the granulations were destroyed. These applications were always followed by a complete filling of the tympanum with acetanilid. The treatment was continued every day for three months. The discharge decreased and became less foul-smelling but did not entirely cease. I have just learned, two years from the date of beginning treatment, that my patient is dying from phthisis. No improvement in hearing noted.

Case III.—F. B. M., female, aged thirty-two years. Occupation, housewife. History of discharge from right ear at intervals of a few years for past sixteen years. When first seen by me one year ago the right meatus was two-thirds full of foul, pasty pus and the lower half of the membrane was absent. The pus was removed with an ear-scoop, and the canal and tympanum cleansed with hydrogen peroxid. Acetanilid was freely insufflated after the cleansing and drying, twice in four days. The discharge stopped on the fifth day, recurred on the fifteenth, when the above treatment was repeated; ceased on the following day, and had not reappeared one month later, at last report. Hearing improved 25 per cent.

Case IV.—H. C. S., male, aged thirty years. Occupation, druggist. Diabetic history. Frequent discharge from right ear for twenty-five years. Patient consulted me one year ago, when I observed a collection of foul pus below a small perforation in the posterior superior quadrant of the membrana tympani. Cleansed with hydrogen peroxid and insufflated acetanilid every other day for ten days, when the discharge ceased and the membrane healed. No recurrence at this writing. Hearing not improved.

Case V.—S. L. E., female, aged seventeen years. Family and personal history of scrofula. Patient had been confined to the

house on account of injuries received from a fall, and her health was much impaired. There had been a fetid discharge from both ears at intervals of a few months for four years. At my first visit, seven months ago, this discharge had returned with increased profuseness. Daily cleansing of the ears with cotton swabs saturated with hydrogen peroxid and the free insufflation of acetanilid was instituted and carried out for two weeks, with marked diminution of the discharge. There was 35 per cent. improvement of hearing in the right ear, and 50 per cent. in the left. Soon afterward I lost sight of the patient, but not before providing her with an outfit with which to personally carry out the treatment.

Case VI.—A. H. S., male, aged eight years. History of suppuration of both ears for six years. When I first saw the patient, six months ago, his mother stated that he had complained of pain in the left ear for ten days and in the right for twenty-four hours. Inspection showed perforation of each drum membrane at the lower end of the manubrium. There was a little serous discharge from the right ear, and more, of a seropurulent nature, from the left; and pulsating of the vessels of the tympanum. I cleansed the ears with dry cotton and applied glycerite of carbolic acid daily for five days. This relieved the pain but the discharge became purulent in both ears. I then began the daily use of hydrogen peroxid and acetanilid. The discharge ceased in the right ear in three and one-half weeks, and in the left in five weeks. Both membranes healed. There was a recurrence in the right ear two months later, but this soon yielded to the same treatment. Hearing improved three per cent. in the right ear.

Case VII.—E. E. W., female, aged nineteen years. Health good. History of a discharge from both ears nine years ago, and recurrence in the left during the previous two weeks. Inspection showed two perforations; the smaller was in the posterior superior quadrant of the membrana tympani, and its edge was covered with one granulation the size of the end of an ivory crochet-needle; the larger was in the lower half of the membrane near the border. I removed the granulation and applied nitric acid to its attachment. I then cleansed the ear and applied acetanilid in the usual manner twice a week for three weeks, when the discharge ceased. No improvement in hearing was noted. The discharge has reappeared within the past three weeks, six months

after the last visit, and the ear now progressing favorably under the same plan of treatment.

Case VIII.—K. C., female, aged twenty-three years. Health fair. Consulted me five months ago. History of recurring discharge from left ear one year, six months, and one month previous. Inspection showed total loss of the membrane and ossicles. After cleansing with hydrogen peroxid I applied a two-per-cent. solution of silver nitrate and insufflated acetanilid daily for two successive days. The discharge ceased on the third day and had not returned one month later, at last report. No improvement in hearing.

Case IX.—A. F. F., female, aged fifteen years. Occupation, student. Patient somewhat anemic and not strong. Left ear had discharged at intervals since an attack of scarlet fever at three years of age, and hearing had been almost lost in that ear. At time of consulting me the discharge was abundant and fetid, with a large perforation in the anterior superior quadrant of the membrane. I cleansed the ear with peroxid of hydrogen, applied glycerite of iodin to the inflamed tympanic membrane and adjacent auditory canal, and then filled the inner fourth of the meatus with acetanilid, closely packed. The following day there was a very little moisture at the outer edge of the impacted acetanilid. The second day the ear was dry, and there had been no recurrence of the discharge at the date of the last report, three months later. The acetanilid was gradually wiped out or fell out, and exposed to view through the old perforation a healthy condition of the tympanum of a formerly chronically suppurating middle ear. The hearing improved gradually until it became half of normal.

Case X.—C. H. T., male, aged seventeen years. Occupation, student. Health fine. History of purulent discharge from the left ear six months before which yielded to treatment but recurred two weeks before I saw him and continued four days. Cleansed for two successive days with hydrogen peroxid, carefully dried and insufflated acetanilid. The discharge ceased on the third day. This case was complicated with a very painful furuncle of the external auditory canal. This was opened and the same treatment applied with happy results. There was no noticeable change in hearing, as was to have been expected in so short a time.

As peroxid of hydrogen was used in nearly all these cases it might be said that the remedial effect was due to it quite

as much as to the acetanilid. Observation has not, however, given me the results with the hydrogen peroxid alone that have compared at all favorably with the simple cleansing and drying of the canal and tympanum with absorbent cotton and the subsequent insufflation of acetanilid. Hydrogen peroxid is employed as a temporary cleansing and antiseptic measure to prepare the suppurating surface for the powdered acetanilid, which acts as a drying agent and also as a valuable antiseptic whose power is exerted so long as it remains upon or adjacent to the surface to be medicated.

A few words in explanation of the details of treatment may not be amiss. First, I carefully remove all the discharge that can easily be reached by an applicator with dry absorbent cotton twisted on its end. Then I saturate the same with peroxid of hydrogen, apply this to the auditory canal and tympanum, and after waiting a minute for it to act, carefully wipe out all resulting débris and moisture. Sometimes, having the patient tilt the head to the opposite side, I fill the middle ear and canal with the hydrogen preparation, and after a minute let it run out and carefully wipe the parts dry. By use of the hydrogen peroxid inspissated mucus, pus or cerumen are softened and disintegrated, and the expansive force of the gas generated is sufficient to carry much of the discharge into the external meatus, and even out on to the cheek if not caught by a bit of cotton. I have never had a case in which it found an outlet by the Eustachian tube, choosing rather the easier way of escape.

Syringing the ear for any purpose except to remove foreign bodies or inspissated cerumen is, I believe, a pernicious practice. The middle ear is an air-cavity and does not bear fluids at all well. They irritate the delicate mucous lining, and so do harm. Further, some of the liquid invariably stays behind, and by its presence adds one of the elements that is essential to suppuration, namely moisture. This danger is largely if not entirely avoided by use of the lively peroxide of hydrogen.

As to the use of acetanilid, I would advise that only the most finely powdered be used, and that but little be applied to the middle ear and canal in acute suppuration, and in most cases of chronic suppuration. In some obstinate cases of the latter prompt and permanent checking of the discharge and a desirable condition of the mucous lining of the tympanum is brought about by packing the middle ear and inner fourth of the canal with this drug, but this procedure is unsafe unless the patient is seen every day

and carefully watched to guard against retained discharge from caking of the powder. An insufflator may be devised from a short piece of glass tubing and a longer piece of rubber tubing of the same size; or the ordinary powder blowers for sale by instrument dealers serve the purpose well, and to my mind are preferable.

PAPER:

PHARYNGOMYCOSIS.

BY L. C. CLINE, M.D.

Pharyngomycosis is a term applied to fungus growth usually found attached to the posterior wall of the pharynx, in the orifices of the crypts of the tonsils, in the folds of the mucous membrane, behind the posterior pillars and on the base of the tongue. It consists of spores or leptothrix which rapidly develop into a vigorous growth projecting from a half to a line and a half from the surface. It may spread from its base and form patches about over the mucous membrane. Leptothrix is the name applied to a species of vegetable bacteria in which the cells assume an elongated, cylindrical or thread-like shape, which multiply by repeated division.

When they become attached to the mucous membrane they multiply rapidly and build up a plant-like mass of spores, which can be easily recognized by inspection. They are of a clear milk-white or chalky color, some of which become hard and horny in appearance and to touch. Examined with the finger, advanced cases impart a feeling much like that of course sandpaper or stiff bristles.

The symptoms of the affection are generally local, causing various degrees of irritation producing a hacking cough. Swallowing gives rise to a feeling or sense of a foreign body in the throat and there is often a very annoying dry, stiff feeling at night.

Constitutional symptoms are absent or exist only in a slight degree. As a rule there is no local inflammation, the tissues between the growths presenting a healthy appearance.

Fraenkel, in 1873, first classified it as a separate disease. From 1873 to 1883 there were but six cases reported. In the

following four years, according to Goris, there were thirty-nine cases recorded. It is thought by some observers that the fungus is deposited on the mucous membrane by inhalation, others think its source in the oral secretions, and especially from carious teeth.

It is claimed that leptothrix is found in the majority of the mouths of patients examined, still mycosis is comparatively a rare disease.

Three conditions may exist from which a differential diagnosis must be made, *viz.:* follicular tosillitis, tonsillar concretions and diphtheria. In follicular tonsillitis we have constitutional symptoms often out of proportion to the local symptoms, the membrane between the follicles is inflamed, while in mycosis it is not. The exudate is easily wiped away while mycotic masses persistently adhere.

Concretions are always found in the crypts, and are not adherent as in mycosis. They are more yellow and cheesy in appearance and can be easily removed. In diphtheria the local and systemic conditions are very marked, diffused inflammation and patches of exudate of recent origin, while in mycosis the growth is seen in small white masses or shoots, with no inflammation in the interspaces and no constitutional symptoms. The growth is much harder than in diphtheria. The microscope and culture tube would clear the diagnosis in case of doubt. The disease is not in itself dangerous to life, but may become firmly rooted and continue indefinitely, causing a great amount of worry and annoyance. It will continue to grow and spread as long as the conditions exist that favor its development. While the disease is a purely local one and does not give rise to general disturbance, except a hacking cough, there is in all probability some systemic condition that favors its development in some individuals while many others escape whose oral secretions contain the germs. Therefore the treatment should be both local and constitutional. Iodine, nitric and chromic acid, nitrate of silver, sulphur, iodoform and mercury in all its forms have been employed to destroy these growths, none of which have but little influence without more radical measures. Curettement followed with chromic acid or stick nitrate of silver is said to have cured some cases.

The treatment that excels all others is the galvanocautery. In using this it is not necessary to curette. The part to be treated should be well cocainized, then a sharp pointed cautery knife should be used, inserting it deep enough to completely destroy

the growth. Attention should be given to any constitutional disturbances that may be found. The disease is exceedingly obstinate and to successfully treat it often requires a great amount of patience on the part of the physician as well as the patient. During the last ten years fifteen cases have come under my observation. They all occurred between the ages of fourteen and fifty. As to sex, they were about equally divided, eight males and seven females.

The history of these cases as to the time they had existed varied from a few weeks to six years. All were otherwise comparatively in a state of good health. It is claimed by some writers that mycosis thrives in an acid secretion only, but in my experience the litmus test showed the secretions to vary from an acid on one occasion to an alkali on another. From my note-book I have selected two as typical cases detailed briefly as follows:

Case I.—Mrs. L., referred by Dr. Gray of Noblesville, Ind., consulted me in April, 1893, and gave the following history. Age forty, apparently healthy and stout, had never suffered from any serious illness except some slight attacks of rheumatism. For two years she had been annoyed with a stiff, raspy sensation in the throat, especially during the act of swallowing; occasionally she would have a metallic taste, could not converse or read aloud without great fatigue and hoarseness. Had been annoyed much with a hacking cough and stiff raspy feeling at night. Numerous gargles and cough mixtures had been used without benefit. On inspection I found a typical case of mycosis scattered over both tonsils, base of tongue and sides of pharynx extending well up under the palate. The treatment in this case consisted in nearly everything recommended to destroy germs, but was finally limited to the galvanocautery, a forty and eighty grain solution to the ounce, of silver nitrate, both of which were applied once a week, together with an antiseptic gargle and sodium salicylate internally. It required three months to hunt out and destroy all of these deposits and effect a cure.

Case II.—Miss C., teacher in the public schools, consulted me on September 5, 1893. General appearance good. She stated that her throat had been troubling her for six or seven years and that she had often scraped and picked off white lumps from her throat. She would get some better during the summer and worse in the winter, especially since she had been teaching. Could not use voice long without great fatigue and aching in the throat. The act of swallowing was painful.

Examination revealed the tonsils slightly enlarged and well covered with the chalk-white deposit, some of which occurred in clusters, others single. The deposits were also found on the base of the tongue and behind the posterior pillars and side walls of the pharynx. Some of these were horn-like in appearance, with sharp jagged points, and could only be removed by tearing them away with the forceps. This patient had also used various treatments with little or no benefit. The case was diagnosed mycosis, and treatment instituted similar to the other one, except in this case it was necessary to completely destroy the tonsils. It was six months before the last vestige of the disease disappeared in this case.

DISCUSSION.

Dr. Robert C. Myles, New York: Mr. Chairman:—I have been treating pharyngomycosis and experimenting with it for some time. I have a young woman under my care who has been treated by a number of physicians with nearly all the germicides. So I proceeded at once on the plan that I had adopted in many cases, that is, to destroy or extirpate them, preferably by excision.

This young patient was nervous, cultured and suffered from most intense gagging. For a number of months I could only approximately finish the case. I removed about fifty little sharp masses, resembling fungi or lichen, from the region of the lingual and pharyngeal tonsils.

There was one beneath the epiglottis, on the lowest lingual tonsil, which I could never succeed in engaging in the forceps. I saw her not long since and there was not a trace of mycosis except the above mentioned one, which had been there about two years. I believe the woman would be entirely free from mycosis if I could get hold of the solitary growth. I have made a number of attempts but have been unsuccessful on account of the persistent and violent retching.

Question: What is your method of excising them?

Dr. Myles: I use the cutting and excising forceps, the lingual tonsillotome and the electric cautery point.

Dr. L. Price Brown, Toronto: Mr. President:—I would like to say something regarding the etiology of the subject. I do not think, because this German authority believes it is a production of the cell, that we should disregard the effect of the leptothrix. It is not only on the surface that we find the leptothrix, but we find it throughout the mass. You will find it all through the mass if you examine it microscopically, and it is questionable whether it could be there if it did not play some rôle in the etiology It is generally said that these cases do not occur after fifty, but I recently had a case in a gentleman of 66. He came to me first

at 59, and was apparently cured, but returned to me only recently. He used a horse and did his own grooming, which may have had something to do with the etiology of the disease. I had a case also last year in a man who worked two or three months polishing cows' horns, and this disease developed. Another case occurred in a girl who worked in a brush factory. She found that when working with certain bristles her throat became sore and finally this condition developed. In another case a girl was working on a farm, making pillows out of the fluffy part of a sort of weed, and after working some time she developed the same disease. If these several cases have any indications they would seem to show the cause of the disease. It must originate from the products of the material with which they were working.

Dr. CHARLES W. RICHARDSON, Washington: Mr. President:—In the *Archiv für Laryngologie und Rhinologie,* Prof. Liebermann, Vol. II., page 365, published an article on pharyngomycosis, entitled, "Ueber Verhornung des Epithels im Gebeit des Waldeyn'schen Schlundringes und über die sogenannte Pharyngomosis leptothrix." I intended to look that paper up, but when I left home my medical library was not accessible and I did not have an opportunity. That article I read carefully and saw the strong points that the author made. I placed the article in the hands of one of our best pathologists, Dr. Walter Reed, of the Army Medical Museum, and asked him to read it over and I would give him some specimens of tonsils or the spores themselves to examine. He returned the article to me and said, "Doctor, it is useless; this gentleman proves his case." In that article this gentleman knocked down another hobby, that is that this disease is due to the leptothrix. He stated that it was due to a hornification of the mucous membrane. It is not necessary for me to enlarge upon this subject; it is only necessary for you to read the article and you will see not only from his text but from his drawings that he proved his case. He stated that the leptothrix is constantly present in the mouth, and its presence in these cases is only its usual presence in the mouth. He pulled these hornified masses away. If they had been of fungous growth, they would have come away easily. We see how horny they are. They are not like the products of spores, which are easily removed. We find the diplococcus pneumoniæ is constantly present in the mouth of every individual, and there is no reason why the leptothrix is not as constantly present and sometimes lodge on these masses after they are formed.

Dr. J. A. STUCKY, Lexington: Mr. President:—I would like to mention the effect of a 25 per cent. solution of pyoktanin in such cases, as Dr. Cline mentioned. I have used it in such cases, and I believe it was the same author Dr. Richardson referred to who first mentioned the use of pyoktanin in these cases. Rubbing it into the masses two or three times a week, in a few weeks they disappear entirely.

Dr. EDWARD FRIDENBERG: Mr. President:—These are occa-

sionally found in the lachrymal passages combined with concretions. Concretions have been found in the crypts of the tonsils. Experimentally, it has been shown that leptothrix causes a precipitation of earthy salts from aqueous solutions, which explains how deposits of these chalky concrements might be formed in the human body. Until these specimens exhibited by Dr. Cline have been chemically and microscopically examined, I think we should consider the subject still open and not settled by our German confrère. It is quite possible that they may be secondary to the deposit of lime in the tissue.

Dr. Robert Levy, Denver: Mr. President:—I wish to call attention to the fact that these may not all be cases of pharyngomycosis. There are cases in which the pharynx, base of the tongue, etc., are affected that are not cases of pharyngomycosis. I have examined a number of cases microscopically. The cases of pharyngomycosis may be recognized often by a thread running from one concretion to another. In other cases the concretions are completely isolated. Before we would consider all these cases pharyngomycoses, we should examine them carefully. They may be simply concretions in the tonsillar crypts which have become calcified from the deposit of lime around them.

Dr. H. W. Loeb, St. Louis: Mr. President:—I wish to make just two observations. First, I have seen this twice in the same family, in a brother and sister, and in the second place, I have never seen a case of pharyngomycosis in which the lingual tonsil was not also involved.

Dr. Lewis C. Cline, Indianapolis: Mr. President:—I feel very grateful for the interest taken in the subject. Of course I do not know what the pathology of pharyngomycosis is. I have had a number of cases and I had considerable trouble in getting rid of them, until I adopted the use of the cautery and pinching them out with the forceps. My experience in removing them with the forceps is that they return unless followed with some caustic application. I succeeded best by taking the cautery needle and burning them. I take only a few at a time, beginning with the largest. As to the pathology, I simply give the best information I could gather from reading on the subject, and I should like to be posted upon what is true. There is no difficulty in diagnosis. Any one can differentiate between the follicular trouble and this, without any difficulty whatever. The follicular trouble is found in the crypts and this occurs around the crypts. In most of my cases the masses have been scattered about over the tonsil and tongue and the posterior wall of the pharynx. As to Dr. Loeb's remarks, I have also had two cases in one family.

PAPER:

THE VALUE OF ELECTROLYTIC DILATATION OF THE EUSTACHIAN TUBES IN CHRONIC TUBAL CATARRH AND CHRONIC CATARRHAL OTITIS MEDIA.

BY ARTHUR B. DUEL, M.D.

A study of the literature of the past decade shows a remarkable change in the attitude of otologists toward chronic catarrhal otitis media. This change has been due not so much to any added knowledge regarding the pathology of the condition as to the method of treating it.

Not many years have elapsed since the patient suffering from this form of deafness was dismissed, often after the first examination, certainly after a short course of ineffectual treatment, with the cheerless assurance that the disease was irremediable; that he might go on for a considerable period without any serious advance of the trouble, but that it would probably grow steadily worse.

This was the prognosis given by the conscientious surgeon, who felt that he had no moral right to continue with the treatment then in vogue after failing to give any relief within a given time. The despairing patient, casting about for some ray of hope, sought in turn the advice of one specialist after another, usually meeting with the same dismal prognosis, until finally he was gathered in by some charlatan, who promised much, but accomplished little or nothing in the way of improvement other than the mental relief afforded by the thought that something was being done.

In more recent years, however, the keener appreciation on the part of otologists of the importance of nasal and naso-pharyngeal obstruction and inflammation in the production of deafness, the improved methods of removal of these exciting causes, and, lastly, the well-grounded conviction that it is worth while, by persistent, painstaking effort, to arrest the advance of this condition, even if no brilliant improvement takes place, have accomplished much for the relief of sufferers with chronic catarrhal otitis media.

The dividing line between these affections is difficult to define, and, indeed, the determining cause usually being the same, the distinction is largely one of convenience. While it is possible that a chronic aural catarrh may begin in the tympanum, with no very marked evidence of any nasopharyngeal or tubal catarrh, it is usually the case that the tubal catarrh precedes or accompanies the tympanic inflammation. It is probably true in the majority of cases that the more serious inflammatory hyperplasia of connective tissue takes place first in the narrow Eustachian tubes, and that the hyperemia of the tympanum is at first often mechanical or functional, due to the stagnation and consequent lowering of air pressure from lack of sufficient ventilation.

The functional hyperemia, characterized by its deficiency in round cells, and the rapidity with which it is reabsorbed when the exciting cause (*viz.*, the closure of the Eustachian tube or pressure on the plexus of veins which drains the tympanum) is removed, gradually changes to one of an inflammatory type in which there is an abundant pouring out of round cells which, by proliferation and increase in size, form into an organized exudate. This inflammatory exudate and newly-formed connective tissue resulting from it, in contradistinction to the mechanical or functional exudate in a simple congestive hyperemia, does not rapidly disappear when the exciting cause is removed (although its advance may thus be stopped), but has a tendency to further organize into connective tissue bands and cords which eventually, by a process of atrophy, bring about the sclerotic stage of chronic aural catarrh.

The writer does not by any means wish to be understood that he believes this to be the stereotyped process in every case of chronic catarrhal otitis media, realizing that in many cases the sclerotic process begins apparently form the start; but the number in which the tube is obstructed early in the course of the disease, and as a result is a chief contributing cause to the mischief done to tympanic structures, is sufficiently large to warrant the presentation of such a picture as a working hypothesis.

This view is largely supported by clinical experience where one finds in such a large majority of cases a marked temporary improvement in hearing following inflation, showing that the retracted membrana tympani and tympanic hyperemia were largely functional, due to stagnation from Eustachian obstruction rather than to serious organic changes.

There is nothing new or novel in this view of the situation,

and it is presented here as concisely as possible, merely as leading up to the proposition that the most important point in the treatment of the conditions under consideration is the ventilation of the tympanum by the early establishment and constant maintenance of the patency of the Eustachian tube, thus eliminating one of the most potent causes of the organic changes to tympanic structures which interfere with their function. This has long been well understood, and, as was remarked at the outset, improved methods and more persistent painstaking efforts on the part of otologists have done much to change the results of treatment.

In the earlier stages of tubal obstruction, when the tissues are swollen and succulent from circulatory hyperemia, the reduction of the swelling by the air douche is now largely accomplished by the use of the Eustachian catheter, accompanied by the diagnostic tube, for the purpose of determining exactly what is being done, rather than by the use of the more inaccurate Politzer bag and dependence on the statement of the patient as to whether or not the tympanum has been inflated.

Later on, when the inflammatory exudate has been poured out, much has been accomplished to hasten its reabsorption by inflation with stimulating vapors.

In the later stages, however, where the exudate has begun to organize into fibrous tissue, it has been found necessary to use bougies to overcome the obstruction. For this purpose bougies of whalebone, metal, and cotton have been constructed and used with marked success.

Lastly, these dilatations have been made by electrolysis, the metal bougie being made the negative pole of the galvanic current. It is for the purpose of calling attention again to the great usefulness of this procedure in the relief of Eustachian obstruction that this paper has been written.

Electrolysis for the purpose of dilating strictures was first made use of by Crussel in 1839, and was first employed systematically in 1867 by Mallez and Tripier, of Paris. In this country, Dr. Robert Newman, of New York, has made use of it, mainly in the treatment of urethral stricture, for more than twenty years, and, in the face of most bitter opposition, has demonstrated its great value.

It was due to a study of its use in this connection and an observation of its practical utility that the author was led to employ it in the dilatation of stricture of the Eustachian tube.

After speaking with a number of prominent otologists, none of whom had known of its previous use in this way, the method was reported as new. A more careful investigation of the literature, however, shows that it was used in London by Mr. Cumberbatch and Dr. W. E. Steavenson in 1888. Seven cases are reported in the *Lancet* for November of that year. The cases all showed improvement, although at that time they had not been long under observation. In an article published in the *New York Medical Record* for December, 1898, Dr. Robert Newman mentions having used the electric current some years ago, for the purpose of dilating strictures of the Eustachian tube, with good results.

Neither Steavenson nor Newman used a bougie which could be protruded for more than an inch from the tip of the catheter, and this, in the writer's mind, would be a cause of failure in securing a patent tube in a large number of cases, since the organized stricture is often found more than that distance from the pharyngeal opening.

The method devised by the writer, without any previous knowledge of the work done by the above-named gentlemen, has been published in detail in previous articles, and is now being practised with marked success by many prominent otologists.

A bougie which could be protruded from the tip of the catheter an inch and a half, or more if necessary, has been passed directly into the tympanum in every instance where it has been possible.

The bougies are made of gold, and correspond in size to Nos. 2, 3, and 4 of the French scale. The smaller sizes are usually used. It probably does not matter so much about the size as that the current should be kept in contact with the hyperplastic tissue long enough for the electrolytic action to take place. The bougie is drawn through a small pure silver catheter until the oval head fits snugly in the opening at the tip. The other end is connected one and one-half inches from the opening by a delicate handle with the negative pole of the battery.

The catheter, after being carefully bent so that it will fit accurately in the mouth of the Eustachian tube, is insulated by winding a narrow strip of rubber tissue spirally from tip to ring. This being renewed each time it is used, the catheter and bougie being boiled, cleanliness is insured.

In any case where the tube is to be bougied the nose and naso-

pharynx should be carefully cleansed with an alkaline antiseptic solution, such as Dobell's or Seiler's, and afterward thoroughly anesthetized with a 10 per cent. solution of cocaine. The patient is connected with the positive pole of the battery by an ordinary contact electrode held in the hand. The negative pole is attached to the bougie as just described. The tube is bougied in the usual manner, the bougie being pushed along until it meets with definite obstruction. Instead of forcing through this by heavy pressure the current is turned on up to from 1 to 3 m. amp., according to the sensation of the patient, and after twenty seconds to a minute the bougie usually will be felt to pass on through the softened stricture with a gentle pressure. At the same time the patient will usually hear "bubbles breaking in the ear." If the desired result is not obtained at the end of a minute or two, no greater pressure should be used, but more current-strength turned on.

It has been the writer's custom not to use more than five milliampères current-strength, nor a contact longer than five minutes at one sitting. This should be repeated at intervals of one week to one month, being guided as to its frequency by the result indicated by inflation every other day. Usually two to four sittings will be sufficient.

The battery should have from thirty to fifty volts, and should be supplied with a good rheostat and millimeter.

It is with the hope that otologists who have not already done so may be convinced of its superiority and led to employ this method of dilating strictures of the Eustachian tube, that the writer calls their attention to the results of the past three years' work in Eustachian electrolysis.

Something over a year ago, through the friendly efforts of Dr. J. F. McKernon, a room at the New York Eye and Ear Infirmary was equipped for the purpose of systematically carrying on this work, and it is by his suggestion and through his courtesy that the writer has devoted the greater portion of his time in the infirmary for the past year in an attempt to fix the value of electrolytic dilatation of strictures of the Eustachian tube. During this time some fifty cases selected from Dr. McKernon's clinic have been bougied, a careful record of the results being kept. As many as these as have persisted for a sufficient length of time to make their record of any value, together with ten cases from Dr. Dench's clinic, reported about two and one-half years ago, and a number from the writer's

private records (in all fifty cases), have here been tabulated for the convenience of those who wish to study them more carefully at their leisure.

To read them now would be tiresome, and I shall only recount briefly the history of the three typical cases and present for your consideration the conclusions arrived at from the experience gained in the treatment of the whole number.

Case I.—Dr. S., aged twenty-eight years, for six or eight months suffered from repeated attacks of tubal catarrh accompanied by deafness, pulsating tinnitus aurium, and a sense of pressure in the left ear. These attacks were relieved by attention to a chronic nasopharyngeal catarrh and inflations through the Eustachian catheter, first with air and later with vapor of iodine and menthol. In spite of constant efforts in this manner the intervals of relief grew shorter, until finally the tinnitus, deafness, and sense of pressure were constant, although at times much more prominent than at others. During this time there was evidence of a constantly narrowing caliber of the Eustachian tube. A No. 3 (French scale) bougie, attached to the negative pole of the galvanic current, was passed into the tube three-quarters of an inch, when it met with an obstruction. Two milliampères current-strength was turned on, and this gradually increased to 4 m. amp. With a slight pressure the bougie passed through a stricture one-quarter inch long, and then on into the tympanum without meeting any further obstruction. Inflations were kept up every day for the next week. There was a gradual increase in the amount of air which entered the tympanum on inflation. After the second day the tinnitus stopped entirely for about a week, when there was slight recurrence for two or three days, coming on intermittently. The tube was bougied again in the same manner. Inflations at intervals of two days for two weeks following showed the tube to be freely opened. There was complete relief from the sense of pressure, no tinnitus whatever, and the hearing was perfect. Several weeks afterward, at the time of this writing, there has been no recurrence. Nothing other than careful attention to the nasopharyngeal catarrh has been done for more than a month.

Case II.—R. D., aged nineteen years, history of deafness and marked tinnitus in right ear, and slight vertigo for several years. Functional test shows lower tone-limit 512 v. s.; whisper, six feet; acoumeter, three feet; bone conduction increased. Practically complete stenosis of right Eustachian tube. At-

tempted inflation fails to improve. For three months—from October, 1896, to January, 1897—the tube was bougied by this method eight times, at intervals varying from one week to one month, inflations being made in the intervals. During this time, practically from the day of the first bougie, there was no tinnitus or vertigo. The hearing distance came up from six feet for the whisper to twenty-five feet, and for the acoumeter from three feet to twenty-four feet. The patient said he heard ordinary conversation perfectly, and easily hear the tick of a clock fourteen feet away which he had formerly heard only on contact. The tube was freely opened on inflation. During the following nine months, instead of presenting himself for occasional inflation, he remained away. He then returned, saying that the hearing was getting worse again. This was found to be true, but on inflation the tube was found to be quite patent and the hearing distance gradually came up after a few inflations nearly to the former point. He was then lost sight of until October, 1898, two years from the time of the first bougie, when he again appeared, stating that he was getting worse. Inflation showed that the tube was still open, and was followed by an immediate improvement in hearing again.

Case III.—Mrs. V., a singer of considerable prominence, had been growing gradually deafer for fifteen years up to May, 1898, despite the fact that she had been under treatment by many distinguished otologists. At that time she presented herself for treatment, stating that she was losing confidence in her ability to place tones properly, owing to the sensation that she was "singing in a barrel." There had been vertigo and tinnitus at intervals. The functional examination was as follows: Lower tone-limit: right, 512; left, 256; b. c. increased on both sides. Whisper: right, four inches; left, two feet. Acoumeter: right, one-half inch; left, one-half inch. Both tubes were constricted and both membrana tympani retracted.

Inflation improved the left but not the right. Both tubes were bougied twice at intervals of two or three weeks. Marked improvement followed. The tubes admitted air much better on inflation, and the hearing distance increased to two feet on the right side and six feet on the left side for whispers. The sensation of fulness in the head and inability properly to place tones in singing largely disappeared, and the hearing for conversation and all sounds improved. Inflations have been kept up for the past year about twice a week, with a rest of about four

months during the patient's absence from town in hot weather, and about one month in winter. The tubes still remain open, and the tests show the same improvements first noted for the whisper and acoumeter. The lower tone limit has improved one octave on either side. The tinnitus and vertigo for the past year have been present much less frequently, appearing only on a few occasions, when the patient has suffered from cold in the head.

The following conditions are presented for consideration: 1. The pathological process in inflammatory conditions of the Eustachian tube and the tympanum is the same—*i. e.,* hyperemia, followed by the exudation of round cells, which organize into new connective tissue, and subsequently atrophy. 2. The names chronic tubal catarrh and chronic catarrhal otitis media, then, should suggest only a difference in position of the inflammation and not in its character. 3. Where the affection is confined to the tube the impairment of hearing is functional, and is restored as soon as the normal patency of the tube is effected. This is true, also, of tinnitus vertigo. 4. Tubal obstruction is present early in a very large percentage of all cases of chronic hypertrophic catarrhal otitis media, and in such instances is one of the chief contributing causes to the further advancement of the disease within the tympanum. 5. It is our duty, then, wherever there is a stenosis of the Eustachian tube to remove the obstruction as rapidly as possible. 6. In every instance where the obstruction is due to an organized exudate the best method for its removal is electrolysis, for the following reasons: (*a*) It is more rapid. In several instances one application of the electrolytic bougie has been sufficient to cause the reabsorption of the deposit, and in the majority of cases only a few applications have been necessary to secure a patent tube. (*b*) It is more efficient. The disappearance of the exudate results from electrolytic action and not by mere pressure, as in other methods of dilating strictures, and consequently requires less force. There is, therefore, less danger of traumatism. The electrolytic bougie has been easily passed through strictures which were so firmly organized that it was impossible to pass a cotton bougie. (*c*) The results are more permanent. A stricture once removed by this method is permanently removed. The primary cause, acting again, may bring about its reappearance, but by careful attention to proper treatment a large percentage of the tubes may be kept patent. 7. The removal of obstructions in the Eustachian tube is only a large factor in and not the whole treatment of

chronic tubal catarrh and chronic catarrhal otitis media. 8. The prognosis in any given case depends largely upon the amount of injury to tympanic structure. Where inflation is followed by marked temporary relief of deafness, subjective sounds or vertigo, one may expect brilliant results from the establishment of the patency of tubes. Where no temporary improvement follows inflation much may be accomplished, although the results are by no means so certain. The narrow tube should be opened, nevertheless, in every instance, with the hope of checking the advance of the disease. In a word, then, the writer wishes to make the points that (1) all narrow tubes should be restored to their normal caliber; and (2) where the narrowing is due to an organized inflammatory exudate, the best means of accomplishing this is by electrolysis.

Tabular Report of Fifty Cases.

Forks used in tests were Hartmann's series and Bench's, ranging from 26 to 64 v. s. (double).

No. of case.	Age	Sex	Duration of deafness.	Tinnitus.	Vertigo	Lower tone-limit, first test.	Bone conduction.	Whisper, first test.	Acoumeter, first test.	Situation of stricture in inches from pharyngeal opening of tube.	No. times bougied.	Period of time under observation.	Whisper, last test.	Acoumeter, last test.	Tinnitus, last note.	Vertigo, last note.	Condition of tubes at last test.
1	45	F.	2 mos.	2 mos.	Occasional	R 512 L 30	+ +	30 feet 30 feet	1½ feet 1½ feet	½ inch ½ inch	4 3	8 mos.	30 feet+ 30 feet+	6 feet 4 feet	.....	.....	Freely open, fairly well open.
2	23	F.	7 mos.	7 mos. 7 mos.	No	R 64 L 128	N N	30 feet 30 feet	15 feet 6 feet	½ inch	1	2 wks.	.....	30 feet	....	....	Open.
3	57	F.	1 year	1 year	Occasional	L....	....	L 8 feet	.....	¾ inch	1	....	.....	.....	.....	.....	Did not return.
4	25	F.	3 mos.	1 year	No	R 30	+	30 feet+	30 feet+	¾ inch	1	3½ mos.	30 feet+	30 feet+	Gone	.....	Open.
5	25	M.	5 years	5 years	"	R 64 L 64	— —	+	.....	½ inch	4	5 mos.	Greatly improved	.....	Much diminished.	.....	"
6	47	F.	3½ mos.	....	Occasional	R 64 L 64	....	3½ feet 6 feet	½ inch 1 inch	¾ inch 1 inch	4 3	11 mos	Slightly improved	.....	Much diminished.	.....	" "
7	40	F.	7 years	....	No	R 256 L 256	N N	1½ feet not at all	1½ feet not at all	¼ & 1 in.	4	8½ mos.	Improved	Improved	Very much dimmished.	.....	"
8	57	M.	10 years	....	"	R 512 L 512	N N	30 feet 30 feet	4 feet 4 feet	½ inch 1¼ inch	2 1	6 mos	30 feet+ 30 feet+	18 feet 16 feet	Entirely gone.	.....	" "
9	21	M.	3 mos.	Yes	"	R 26 L 26	+ +	30 feet 30 feet	3 feet 3 feet	1¼ inch	5	10 mos.	30 feet+ 30 feet+	....	Very much diminished.	Very much diminished.	"
10	16	F.	6 mos.	"	"	Gal. 45	....	R 1 foot L 30 feet	1 foot 30 feet	½ inch	1	1 mo.	20 feet+	20 feet	Entirely gone.	Entirely gone.	"
11	48	F.	21 mos.	"	....	....	....	R 26 feet	W 14 in.	¼ & ½ in.	2	1 mo.	.....	W 24 in.	Stopped.	.....	Fairly well open.
12	32	F.	4 mos.	"	No	....	....	R 8 feet L 24 feet	2 feet	¾ inch	2	1 mo.	30 feet+	11 feet	Stopped.	.....	Open.
13	37	M.	6 mos.	"	"	R 40 L 128	....	32 feet 4 feet	2½ feet ½ inch	½ & 1¼ in. 1½ inch	3 4	4 mos.	30 feet+ 30 feet+	6 feet 3 feet	Improved.	Improved.	Partly open.
14	23	F.	4 years	"	"	....	....	.....	.....	1 inch	3	6 mos.	.....	.....	Not improved.	Not improved.	Open.
15	40	F	20 years	1 year	"	R 256 L 32	....	4 inches 30 feet	½ inch	¼ inch	2	4 mos.	24 inches	4 inches	Much improved.	Much improved.	"
16	53	M.	15 years	15 years	10 years	....	....	4 feet 10 feet	4 inches 2 feet	¼ inch ¾ inch	1	1 mo.	6 feet 12 feet	.....	Did not return for treatment.		

17	19	F.	2 mos.	Yes	No	....	....	.....	.....	L 1 inch	2	3 mos.	.....	.....	Stopped	Stopped	Open.
18	22	M.	7 mos.	"	Yes	R 26 L 26	N N	30 feet + 30 feet	30 feet + 30 feet +	1 inch	1	....	.....	.....	Entirely relieved.	Entirely relieved.	"
19	26	M.	5 mos.	"	No	R 256 L 26	+ N	3 feet 30 feet	3 inches 30 feet	½ inch	2	5 mos.	30 feet 30 feet	30 feet 30 feet	Entirely relieved.	Entirely relieved.	"
20	22	F.	2 years	"	"	R 128 L 512	+ +	4 in cannot distinguish contact	½ inch	½ inch 1 & 1½ in.	1 2	4 mos.	Much improved	Much improved.	Relieved.	Relieved.	Partly opened.
21	34	F.	7 years	"	"	R 256 L 256	+ +	9 feet 15 feet	6 inches 10 inches	1 inch 1 inch	3 1	4 mos.	Much improved	Much improved.	Relieved.	Relieved.	Only partially opened, strictures not passed; patient left.
22	30	F.	1½ yrs.	"	"	R 128 L 512	+ +	10 feet 4 feet	10 feet 4 feet	1 inch ¾ inch	1 3	1 year	30 feet 12 feet	16 feet 8 feet	Much relieved.	Much relieved.	Fairly open
23	48	F.	1 year	"	....	....	....	.....	.....	L 1 inch	2	1 mo.	.....	.....	Stopped.	Stopped.	Open.
24	40	M.	4 years	"	No	512	—	2 feet	½ inch	½ & 1¼ in.	3	2 mos.	No improvement.	No improvement.	.....	.....	Fairly open
25	14	M.	2½ mos.	"	"	R 26 L 40	....	26 feet 26 feet	26 feet 26 feet	1 & 1¼ in. ¾ inch	3 2	2 mos.	.....	.....	Stopped.	Stopped.	Open
26	37	F.	7 mos.	"	"	R 512 L 512	— —	8 inches 8 inches	½ inch ½ inch	1 inch 1 inch	2 2	3 mos.	No improvement.	No improvement.	No improvement.	No improvement.	"
27	47	M.	5 years	"	"	....	....	R 10 in. L 8 in.	4 inches 8 inches	½ & 1¼ in. ¾ inch	3 4	2 mos.	Improved.	Improved.	Stopped.	Stopped.	Fairly open
28	38	M.	30 years	14 years	Yes	512 512	— —	4 feet 1 foot	2 feet 1 foot	1¼ inch 1 inch	2 2	8 mos.	No improvement.	No improvement.	Greatly diminished.	Greatly diminished.	Fairly open
29	16	F.	3 years	Yes	No	512 512	+ +	10 feet 6 feet	5 feet 3 feet	¾ inch ½ & 1¼ in.	1 1	1 mo.	Much improved.	10 feet 6 feet	Greatly diminished.	Greatly diminished.	Open.
30	54	M.	20 years 1 year	"	"	35 gal. 128	+ —	Not at all	Contact	Complete stenosis 2 inches 1 inch	5 3	5 mos.	Marked improvement of hearing.	Marked improvement of hearing.	Marked improvement of hearing.	Marked improvement of hearing.	Fairly open
31	43	M.	9 mos.	"	"	64 32	— N	1 foot 27 feet	1 inch 4 inches	½ & 1½ in.	2	1 mo.	Slight improvement.	Slight improvement.	Slight improvement.	Slight improvement.	Open.
32	20	F.	5 years	"	"	256 256	....	15 feet 15 feet	6 inches 6 inches	¼ inch 1 inch	3 2	10 mos.	20 feet 20 feet	10 feet 12 feet	Diminished	Diminished	"
33	37	M	10 years	"	Yes	128 1024	— N	30 feet 4 feet	3 feet Contact	¾ inch ½ inch	1 1	1 mo.	30 feet + 24 feet	30 feet + 11 feet	Diminished	Stopped.	"
34	27	M	5 mos.	"	"	....	....	.....	.....	1 inch	2	2 mos.	Improved	.....	Stopped.	Stopped.	Fairly open
35	..	M.	6 years	"	"	40 128	N +	30 feet 20 feet	30 feet 2 feet	.....	1	1 mo.	30 feet	8 feet	Diminished	.....	Open.
36	54	F.	2 years	"	"	512 40	+	30 feet 3 feet	30 feet 1 inch	1 inch	1	1 mo.	10 feet	6 inches	Improved.	Improved.	"

No. of case.	Age	Sex	Duration of deafness.	Tinnitus.	Vertigo.	Lower tone-limit, first test.	Bone conduction.	Whisper, first test.	Acoumeter, first test.	Situation of stricture in inches from pharyngeal opening of tube.	No. times bougied.	Period of time under observation.	Whisper, last test.	Acoumeter, last test.	Tinnitus, last note.	Vertigo, last note.	Condition of tubes at last test.
37	41	M.	10 years	Yes	No	128 512	+ —	2 feet 2 inches	2 inches ½ inch	½ inch 1 inch	2 1	3 mos.	Improved.	18 inches	Not improved.	Not improved.	Open.
38	59	M.	10 years	"	Yes	....	....	L 6 feet	.....	1 inch	1	....	15 feet	.....	Much improved.	Much improved.	Still very narrow.
39	51	M.	4 mos.	"	No	128 64	....	4 feet 20 feet	½ inch 3 feet	1 inch	2	1 mo.	24 feet	6 feet	Stopped.	Stopped.	Open.
40	34	M.	12 years	"	"	....	....	.....	.....	1 inch 1 inch	3 3	1 mo.	.....	.....	Very much diminished.	Very much diminished	"
41	42	F.	15 years	"	Yes	512 256	+ +	4 inches 2 feet	½ inch ½ inch	½ inch ¾ inch	2 2	1 year	2 feet 6 feet	6 inches 1 foot	Improved.	Improved.	"
42	19	¦M.	5 years	"	"	512 128	+	6 feet	3 feet	½ inch	8	2 ½yrs.	25 feet	24 feet	Much improved.	Much improved.	"
43	66	M.	15 years	"	No	256 26	N N	20 feet 20 feet	2½ feet 2½ feet	½ inch 1¼ inch	3 3	1 year	30 feet 30 feet	4 feet 5 feet	Much improved.	Much improved.	"
44	48	M.	1 year	"	"	256 256	N N	3 feet 3 feet	1 inch 1 inch	¾ inch ½ & 1½ in.	2 3	3 mos.	Much improved.	Much improved.	Improved.	Improved.	"
45	50	M.	5 years	"	"	128 128	— —	.....	.....	1 inch 1 inch	1 1	1 mo.	No improvement.	No improvement.	No improvement.	No improvement.	"
46	39	M.	10 years	"	Yes	128 1024	....	30 feet 4 feet	3 feet Contact	½ inch 1 inch	1 1	1 mo.	.....	11 feet 1 foot	Diminished.	Stopped.	"
47	45	M.	15 years	"	No	26 26	N N	20 feet	8 feet	1 inch	3	1 year	30 feet	24 feet	Stopped.	Stopped.	"
48	66	M.	15 years	"	"	256 26	N N	20 feet + 20 feet +	2½ feet 4 feet	½ inch ¾ inch	3 3	1½ yr.	30 feet + 30 feet +	6 feet 10 feet	Improved.	.....	Fairly open
49	60	M.	5 years	"	Yes	....	N	.....	.....	.....	1	....	.....	....	Stopped.	.....	Open.
50	48	M.	1 year	"	No	256 256	N N	3 feet 3 feet	1 inch 1 inch	1 inch ½ inch	3 2	4 mos.	4 feet 4 feet	Improved.	Stopped.	.....	"

DISCUSSION.

Dr. E. B. Dench, New York: Mr. President:—I was very glad to hear Dr. Duel's remarks and I do not feel competent to discuss them. Although I have been only using the simple bougie, I wish to commend the paper read by Dr. Duel. I have seen his work and I can consequently look upon it largely as if it were my own. My colleagues have used the method much more than I have and although I have used it with good results I still use the simple bougie. You know it is hard for an old man, like an old dog, to learn new tricks, but I can now heartily and emphatically endorse the paper. My only criticism is that the instrument cannot be so easily introduced as the simple bougie. I hope in the course of a year or so to have some statistics, which I trust may be as flattering as those given by Dr. Duel. In the cases I have seen, the stricture has not been so well cured by the electric bougie. There is another point on which I differ with him and that is that I have never seen a stricture which I could get through with the ordinary bougie. I wish to go on record as thoroughly endorsing the method in every way and I think the Society owes Dr. Duel a vote of thanks both for the careful preparation of the paper and for the original work in perfecting the instruments, and for the careful statistics he has kept during the last few years.

Dr. Jas. F. McKernon: Mr. President:—There are one or two points the Doctor might bring out in closing the discussion. After using the ordinary method of dilation I sent for the set referred to by Dr. Duel and the instrument maker sent up a very inferior set. A point he lays stress on is that the bougie must be long enough to pass through the whole length of the Eustachian tube and up into the tympanum. The bougies sent me, which were sold under the name of Dr. Duel's bougies, were not long enough, and if any of the gentlemen find that they do not get results they may find that the trouble is in the length of the bougies. If I had not been in such close contact with Dr. Duel, in this work, I should have had one failure after another, owing to their faulty construction. But having used the platinum bougie first, and then this gold bougie, I readily noticed the difference. And here I might mention a failure, or rather an accident, by this method, causing an acute otitis media. It was a case of tubal catarrh with a very distressing tinnitus and the tube was a very tight one. I first tried the ordinary method of dilatation but was unsuccessful as I could not get through without causing the patient considerable pain, even under cocaine. I got through very readily with a three milliampere current and a contact of some three minutes. The next morning I found the patient suffering intense ear pain and the drum membrane was markedly distended and inflamed. I incised the drum membrane and the otitis quickly cleared up. What that was due to I don't know; possibly I introduced the

bougie too rapidly into the middle ear and caused hyperemia and some laceration or I may have carried infection into the tympanum. It is the only case that has come under my observation of any bad results. As soon as the otitis media cleared up the trouble all disappeared. Then another point is, how long shall we wait before inflating the tube after using the bougie? I wait at least four days, and I think it is better to wait a week to reduce the traumatism that must exist after passing the bougie. I think where the tube is very tight it is better to have the contact longer, go slower, and use a light current, rather than to hurry matters. I had some cases to report, but as the results are simply confirmatory of the cases given by Dr. Duel I will not mention them. There were some forty cases altogether..

Dr. ARTHUR B. DUEL, New York: Mr. President:—Regarding the permanency of cure by the method I have outlined, I would say that I have a number of cases that have remained open nearly two years, without any further dilatation having been made. I do not know of any cases bougied by any other method that have remained open for that length of time. Regarding false passages, there is no question but there are many strictures of the Eustachian tube which are very old and very tough, and then bougieing it depends entirely upon the operator's nerve, and the amount of pressure he is willing to use to force a bougie through the canal. The point of superiority of this over any other method is that a slight pressure is required and there is little chance of making a false passage. The stricture is softened by electrolytic action and is not forced through by great pressure. In regard to the acute otitis media Dr. McKernon has spoken of, I have had two cases in which it has occurred. An acute otitis is likely to be set up by any method. It is often a matter of carelessness. The nasopharynx and the mouth of the Eustachian tube should be thoroughly cleansed, and even then it is possible that in some instances acute otitis media may be caused. I would urge upon the Society the importance of opening all the Eustachian tubes early, when the exudate is found to be organized, on account of the fact that the mechanical hyperemia which takes place in the tympanum in consequence, may set up a process beyond control.

PAPER:

AUDIBLE NOISE IN THE MASTOID FOLLOWING FRACTURE OF THE BASE OF THE SKULL.

W. A. MARTIN, M.D.

Mrs. S——. was thrown from a horse in July, striking on the side and back of the head, quite a tumor forming over the right mastoid process. There was copious bleeding from the nose and right ear, the latter being controlled by plugging while the former ceased spontaneously. She lay unconscious for twenty-four hours when she commenced to slowly regain her mental faculties. Diagnosis of fracture of the base of the skull was made by Dr. W. F. Jones of San Rafael, who had charge of the case. I was called a week after the accident to look after the ear, at that time the region of the mastoid was greatly swollen, the swelling extending down the side of the neck along the sterno-cleido-mastoid muscle. The external auditory canal was filled with a mass of disintegrated blood, epithelium, etc., with some indication of foul-smelling pus. When thoroughly cleaned the membrana tympanum was found ruptured, but it was difficult to determine the upper border of the auditory canal; about the junction of the bony and cartilaginous portions there was a bulging, which, after the subsidence of the swelling, we determined was the line of the fracture. The hearing was fairly good considering the condition, low conversational voice being heard at two meters and the watch about three inches. She complained about a peculiar noise in the ear, that sounded like a tin horn, so loud at times that it kept her awake. I thought at first it was a tinnitus, but Dr. Jones informed me that with his own ear three inches from the patient's mastoid he could hear the noise distinctly and with the phonendoscope it was exceedingly loud; but it had subsided somewhat in the past few days. While I was standing by the bedside the patient informed me that she could hear the noise. I listened with the otoscope and heard the noise; it was quite loud and distinct, and synchronous with the pulsation of the radial artery, and, as she remarked, like the musical tone from a small horn. With the stethoscope it was much louder; the point of greatest intensity being nearly in front of the tip of the mastoid process. I am unable to explain

the cause of this peculiar phenomena. I thought at first of a traumatic aneurism in connection with some of the larger vessels of the neck; but the noise was unlike the aneurismal bruit I have heard, so concluded that it must have had some connection with the pneumatic spaces of the mastoid, how? the reader is at liberty to theorize for himself. Suffice it to say that the noise continued at intervals for three weeks when it finally ceased.

At present, three months after the accident, the patient hears ordinary conversational voice at five meters and the watch at twenty centimeters. There is a permanent opening through the M.T. but otherwise she is in normal condition. Since writing the foregoing account I see a similar condition in the case of a child was reported at the August meeting* of the S. F. Medico-Chirurgical Society by Drs. Lane and Rigdon, no explanation was offered.

PAPER:

A PRELIMINARY REPORT UPON THE USE OF PURE CARBOLIC ACID IN THE TREATMENT OF MASTOID WOUNDS AND CHRONIC SUPPURATION OF THE MIDDLE EAR.

BY WENDELL C. PHILLIPS, M.D.

At a meeting of the Medical Society of the County of New York, held February 27, 1899, Dr. Seneca D. Powell read a paper, entitled "Carbolic Acid in Surgery," an abstract of which appears in the *Medical Record* of March 11, 1899. He said that the paper represented the results of his observations at his clinic in the Post-Graduate Medical School during the past fifteen years. About five years ago he had ascertained that in ninety-five-per-cent. alcohol he had an antitdote to carbolic acid. He demonstrated before the Society that a niney-five-per-cent. solution of the crystals of carbolic acid could be rubbed freely on the hands and allowed to remain for a few seconds without any unpleasant effect from it, if the hands were then rinsed with alcohol. He said he knew of three cases of carbolic-acid poisoning

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in which alcohol had been successfully used internally. Many of the results to be described had been obtained by using carbolic-acid solution of the strength of one-half drachm to the ounce. In mammary, tuberculous, and other abscesses, granting that there is suppuration resulting from microbic action, our treatment to be effective must be capable of destroying these microbes. In these abscesses no difficulty need be experienced in controlling the suppuration if carbolic acid was properly used. The cavity must be thoroughly cleaned out by irrigation, followed by curetting; after this has been done the cavity should first be filled with strong carbolic acid and the acid evacuated, then filled with alcohol and the alcohol evacuated, and finally the cavity should be washed out with water. By this method he frequently succeeded in converting a foul pus cavity into a clean granulating wound in from twenty-four to forty-eight hours. Tuberculous abscesses should be swabbed out every day until healthy granulations were obtained. It was a mistake to suppose that ulcers and wounds would not granulate under such treatment. Bone abscesses were also amenable to its treatment.

Dr. D. B. St. John Roosa had used this treatment for two years past in mastoid abscesses, and had spoken highly of it. He had used used it in cellulitis of the hand, lymphangitis, and empyema. He had recently evacuated two quarts of pus from a case of empyema, and had filled the cavity with a solution of carbolic acid of the strength of one-half drachm to the ounce. A piece of gauze had then been inserted into the opening, and the dressing had not been changed for a week or more. By this time there was practically no further discharge. He had used it in cystitis and erysipelas.

In the discussion following, Dr. A. M. Phelps said that he had verified in his own practice almost every claim made by the reader of the paper. In washing out tuberculous joints with carbolic acid there resulted a great deal of exudation, but the cases invariably went on to convalescence, except when there was bone disease beyond the reach of the acid.

Dr. Powell also said he had found carbolic-acid solution most useful in treating ivy poison, and had used it in many cases of injuries to the fingers, yet he had never seen any necrosis which seemed to be fairly attributable to its use.

Following the line of thought outlined in Dr. Powell's paper, I have for the past three months made use of pure carbolic acid in the treatment of mastoid wounds, chronic suppurative otitis

media in which necrosis existed, and in the sinuses so often found in mastoid wounds, which are so difficult to heal. This treatment has proven very helpful.

I have prepared the carbolic acid by adding simply enough water to the crystals to hold them in solution; and at first the applications were all made by means of the cotton probe. Later on it was found that especially in the attic cases it was difficult to get the carbolic acid into contact with the tissues. In order to overcome this difficulty I had a spray apparatus made, with the tube so finely drawn that I was able to introduce it into the aural canal and spray the acid into the attic and middle ear. This method had been found to be very useful and effective. In nearly all the cases in which this method of treatment has been adopted the suppurative process has almost immediately commenced to subside.

Time will not be taken to give many detailed histories of cases, and it is understood from the title of this paper that it is to be but a preliminary report, and it is given to the members of this association that they may also, if they feel inclined, adopt this method of treatment and test it for themselves. That it has a helpful effect in necrosed conditions of the bone there can be no doubt. In several of my cases which had resisted all methods of treatment rapidly healing followed its use. While others, and especially the middle-ear suppurations, are not fully cured, yet the improvement has been so marked that the patients have expressed themselves as heartily pleased with its use. It causes pain and discomfort for a few minutes, but the alcohol is more painful than the carbolic acid. It is advisable, if possible, to avoid using an excess of carbolic acid, thus obviating the necessity for using too much alcohol. Up to this time I have no ill effects, no inflammatory reaction, and no extension of the disease from its use. In one case of probable tuberculous mastoid its effect was not sufficient to obviate the necessity for another curettage, but following the curettage its use has seemed rapidly to lessen the tendency to suppuration.

The histories of the following cases are briefly given:

Case I.—W. R——, aged forty-five years; mastoid operation, September, 1898. January 1st: The mastoid wound had closed into a suppurating sinus extending into the mastoid antrum. No treatment had been of any value. January 7th: Began applications of pure carbolic acid every other day. The sinus entirely healed in seventeen days.

Case II.—M. F——, age forty-two years. On January 1st he had a suppurating sinus leading into the mastoid antrum resulting from a mastoid operation done November 11th. Up to this time the sinus had resisted all treatment and remained open. Began pure carbolic-acid applications on January 12th, and the sinus closed in fourteen days.

Case III.—J. H———, aged twenty-eight years; suppurating sinus from a mastoid operation performed in August, 1898. Began the pure carbolic-acid applications on January 10, 1899. The sinus closed in twelve days.

Case IV.—August 4th, M. B——, aged twenty-one years; otitis media suppurativa chronica with mastoiditis operation on January 28th. The tympanic cavity and mastoid cells were filled with pus which had perforated from a large sub-parietal abscess. All diseased bone and granulation tissue were cut and curetted away, leaving a large mastoid wound which was kept absolutely free from infection of pus from the tympanic cavity by daily applications of pure carbolic acid. The discharge from the tympanic cavity was profuse and resisted treatment. The use of pure carbolic acid was begun through the external auditory canal in February 20th, by means of a cotton carrier, and continued until about March 20th, when the spray of pure carbolic into the middle ear through the external auditory canal was begun. The patient was discharged May 1st with the mastoid wound entirely healed and the middle ear dry.

Case V.—A. R——, aged five years, had a mastoid operation on September 21, 1898. This patient was ill-nourished and tuberculous, and the mastoid wound persistently refused to heal. On November 3, 1898, another curettage was resorted to, which for a time improved the condition. Subsequently the whole wound developed a mass of suppurating necrosis. I began the use of pure carbolic acid on January 1st in the mastoid wound and in the middle ear. This was followed by marked reduction in the suppuration from the middle ear, and the mastoid wound improved, but there was a large surface of denuded bone, and the third curettage was done. After this curettage the carbolic acid was sprayed into the ear every second day and the wound packed with sterile gauze. The patient was allowed to go home on May 14th, with the wound almost healed, and the middle ear practically dry; on May 25th he was returned to the hospital

with a profuse discharge from the middle ear due largely to negligence on the part of his caretakers at home.*

Case VI.—J. O——, aged two years, had a mastoid operation January 23, 1898. At this operation the mass of bone removed was very great and the tympanum was curetted. Under daily applications of pure carbolic acid the mastoid wound was kept clean and dry, but the middle-ear discharge remained profuse until the carbolic acid was used by means of an atomizer, when it began at once to improve; but as the middle ear was again filled with polypi the patient was again submitted to operation on March 18th. The entire wound was thoroughly curetted and the same treatment continued. The patient was discharged May 1st with the wound healed and the ear dry.

A number of other patients had at different times during the healing of their wounds spots of infection in various places, which were usually immediately rendered aseptic by one or two applications of carbolic acid, and the filling of the cavities with healthy granulations was not interfered with. In those cases in which the wounds show no tendency to granulation, and the depressions are found filled with pus, pure carbolic acid applied every other day causes small healthy granulations to spring up and greatly facilitates the final healing of the wounds.

I am indebted to Dr. H. H. Martin, hospital surgeon of the Manhattan Eye and Ear Hospital, for arranging these few histories which have been submitted.

*August 1st: For one month the wound has been entirely healed, and will, no doubt, remain so.

PAPER:

LATERAL SINUS THROMBOSIS AND ACUTE LEPTOMENINGITIS BOTH COMPLICATING ACUTE SUPPURATIVE OTITIS MEDIA; COMPLETE PERFORATION OF THE CRANIAL WALL ABOVE AND EXTERNAL TO THE ANTRUM.

BY WENDELL C. PHILLIPS, M.D.

Case I.—M. F., aged fifty years, presented himself at my clinic at the Manhattan Eye and Ear Hospital, November 12, 1898. Eight weeks previously he had suffered from a severe pain in the left ear, followed in a few hours by a very slight discharge. The discharge lasted at intervals up to three weeks previously, since which time there had been none. During this time the pain had been almost constant. About two weeks before admission leeches had been applied over the mastoid by his family physician. This pain although localized generally over the region of the mastoid gradually extended over the left hemisphere and especially over the lateral and longitudinal sinuses. For the past two weeks he has suffered from chills and vomiting. The chills have increased in frequency and have been accompanied with considerable prostration. During the time of the first examination he had several distinct rigors. His appearance was somewhat aseptic and his tongue coated. The membrani tympani looked very thick and fibrous and with slight bulging over the attic region. There was no swelling over the region of the mastoid and but little tenderness.

The patient is poorly nourished. The skin dry and appeared to have a somewhat icteroid hue. Tongue thickly coated with a grayish-brown furring. Bowels constipated. Pulse 110, but weak and somewhat irregular. Temperature 101.4° F. Patient complains of pain over the left side of the head, especially over the mastoid, which is increased slightly on pressure over that region. No swelling nor edema over the mastoid. There is a very slight mucopurulent discharge from the canal. The patient's general appearance, history, and his symptoms led me at the very first examination to feel that this was a case of infective sinus disease, and this diagnosis was ventured. His symptoms seemed to me clearly to warrant such a diagnosis, and they certainly fol-

lowed out the symptoms of this disease as described by Macewen.

The patient consented to operation which was immediately done. He even had a chill just before the administration of the anesthetic. Previous to opening the mastoid wound a paracentesis was done, but no pus was found. The usual mastoid opening was made. The surface of the bone was somewhat congested and blood oozed freely from the surface generally. With gouge and chisel the mastoid table was removed, the cells opened and the antrum exposed, and through-and-through drainage was established, but with no sign of pus. Attention was then directed toward the mastoid tip, but not until the end cells had been reached was there any pus found, and then but a very small quantity.

The bone in this case was unusually flinty, so much so that several chisels were broken. The lateral sinus was then exposed and, not pulsating, it was opened for about one and a half inches, no bleeding followed the incision. There was no indication of any involvement of the internal jugular vein.

The incision extended from above and posterior to the angle through the sigmoid and well down toward the jugular bulb. Small masses of clotted blood were then removed from the sinus with a curette. The curette was passed downward and all masses removed until there was slight bleeding. Posteriorly a curved groove was passed far backward and all granulation masses and clots were removed. Slight bleeding was established from the region of the torcular and the wound was thoroughly cleansed and both sinus and wound packed with iodoform gauze. The patient suffered considerable shock, but reacted promptly under hot applications and stimulants.

On November 13th the general condition seemed considerably improved. The wound was dressed and found perfectly clean and dry and the sinus wound was closed. After the operation his temperature became normal and at 3 A.M. the following morning it had gone down to 97° F. By noon of the same day it had reached 102° F. For several days the temperature varied from 100 to 102° F. and did not again reach normal until November 21st, and even after this it varied until November 22d, when it became normal and from that time remained practically so until his discharge.

November 15th, the wound was dressed and found clean and dry. November 17th, the wound was dressed and there was a slight sero-sanguineous discharge near the jugular bulb. This

was cleaned with peroxide of hydrogen and dressed as usual. November 21st, the wound dressed dry and clean. The patient complained of pain in the limbs. He was given milk-punches and one-sixtieth of a grain of strychnine three times a day. November 25th, the wound dressed, a small area of exposed bone was found in the sinus. December 6th, wound was dressed, the opening in the antrum closing up, dressing was clean and dry. December 26th, condition the same. Area of exposed bone nearly covered.

From January 1st the sinuses were treated by the carbolic-acid method, as described in a previous paper, where it will be seen the wound closed in fourteen days. The case has since remained well and the man has returned to his usual occupation.

The chief point of interest in this case is the fact that diagnosis of infective sinus disease was made in a comparatively early stage of the disease and with but slight mastoid or middle-ear symptoms, thus doing away with the necessity for the more radical operation of the opening or removal of the internal jugular vein.

The advantages of an early diagnosis in sinus disease cannot be overestimated and it would seem to the writer that our efforts should be largely expended along this direction. To be sure many of these cases do not come under our observation until they have become extreme, but in the light of present developments along this line even the general practitioner will gradually come to recognize the importance of the help of the otologist even in the care of simple suppuration.

Case II.— M. B., aged forty-seven years; housewife; was first seen October 29, 1898. Her history is as follows: Three weeks ago she began to have pain in the right ear. For many years she had been subject to neuralgic pains in the head, which were usually worse on the left side. The ear began to discharge, after a few hours, a creamy pus, which continued. The discharge was rather profuse, with pain more or less severe over the right side of the head. Three days before admission to the hospital the pain became very severe and seemed to localize behind the ear. She never had had previous attacks of suppurative middle-ear disease. Up to the time of her admission to the hospital she had attended to her usual household duties, and while suffering considerable pain she had been up and about all the time. She had not had any chill, fever nor vertigo. The diagnosis of acute mastoiditis was made and she was admitted to the ward.

The patient was a well-nourished, strong looking woman. Her complexion was slightly pasty and her mucous membranes anemic. Deep pressure over the mastoid elicited pain and there seemed to be very slight swelling over its upper portion. Calomel was administered internally, and, believing it to be a case of really acute inflammation of the mastoid, the ice-coil was used. The canal was cleansed with a hot boric acid douche every two hours.

October 30th the swelling had subsided and there was no pain on pressure over the mastoid, but the patient complained of headache, mostly occipital. In the afternoon she had a very slight chill which was followed by sweating. Her temperature at the time of admission had been 103° F., but it subsided and by 3 A.M. the following morning had reached nearly normal. October 31st she still complained of the occipital headache, but pain over the mastoid was absent, swelling and the discharge were somewhat lessened. The ice-coil was discontinued. The existing pain was more general in character and the patient complained very little of the ear. November 1st, patient slept well last night. Still complained of headache all over the head. November 2d, less headache, but now complains slightly of pain in the lumbar region and extremities. No increase of pain on pressure over the painful area and no signs of inflammation of the joints. November 3d, patient did not sleep well. Still complains of pain in the back and limbs. November 3d, did not complain of any increased pain in the head and there was no increase of tenderness of the mastoid tip, although it remained slightly tender.

Patient was up and about the ward. The temperature had remained normal. During these days the pulse had varied from 80 to 102 and the temperature had at no time been above 102° F., remaining most of the time at from 99 to 100° F. On this day I was detained and did not get to the hospital, so I did not have an opportunity to examine her. November 4th, during the night the patient became somewhat restless and about 4.30 A.M. the night nurse first noticed a change for the worse, but even at this time the patient was out of bed and used the commode, but her mental condition was not good and in a short time she became somewhat delirious, and still complained of pain in the back. The condition became rapidly worse and at 6.45 A.M. she was unconscious, pupils contracted, reaction sluggish, particularly in the right eye, limbs became somewhat rigid and semiflexed, the face pallid and the skin cold. I was telephoned for and reached the hospital at 7.45 A.M. At this time there was no pupillary

reaction, the respirations were shallow and there was loss of sensation in the left arm. The face had now become flushed and she was perspiring freely. At this time it was almost impossible to count the pulse, but it had gradually become slow. At 4 A.M. it was 60. Directions were given to prepare for operation, but her condition became so rapidly worse that it was abandoned and she died at 10.30 A.M.

Autopsy was performed the same day. The tympanum and mastoid were full of pus, the dura over a portion of the right side was thickened and adherent to the petrous portion, otherwise the dura was in a healthy condition. There was a subarachnoid infiltration of pus, indicative of general leptomeningitis. All the sinuses were in a perfectly healthy condition. Careful section of the brain-tissue showed no abscess cavities in either cerebrum or cerebelli. The entire mastoid process, excepting the tip, was one large abscess-cavity. There was a perforation through the external wall nearly one-fourth of an inch in diameter. The internal wall was entirely gone and the necrosis had extended entirely around the sinus and pus had perforated the adherent dura posterior to the tegmen tympani. The walls of the sinus were somewhat thickened. From the appearance of the specimen the pus seems also to have entered the labyrinth. The brain-tissue was not involved, there being no abscess of cerebrum or cerebellum.

This patient was examined by several members of the staff during the early part of the time she was in the hospital, but no one suggested a cerebral complication. The conclusions to be drawn from this history would seem to be: The ice-coil should not have been used; that it masked the symptoms and reduced the external inflammatory swelling, the tenderness and temperature, there can be no doubt. An early operation would have saved her life. Further, that the extensive leptomeningitis could possibly have been present in a case manifesting so few meningeal symptoms either of the eye, or of the mental faculties, or of loss of sensation and motion, seems almost incredible. It would almost seem that there must have been a sudden escape of pus through the perforation and that its presence over so large a surface of brain tissue gave rise to the sudden condition of shock from which she suffered early on the morning of her death. In all cases of mastoid inflammation in which there is no external or even marked indications of the disease, the ice-coil should be resorted to with great caution.

Autopsy showed tympanum and mastoid full of pus with a perforation in the roof of the tympanum. No sinus involvement. Subarachnoid infiltration of pus. No abscess of cerebrum nor cerebellum. Microscopical sections taken from cortex on left side of frontal lobe show thickening of arachnoid; a subarachnoid infiltration of densely packed leucocytes, many of which are polynuclear; slight thickening of the blood-vessels which are full of red blood-cells. The pia mater is apparently thickened, but is almost indistinguishable from the infiltration. The leucocytes follow slightly the process of the pia, which dip into the cerebral tissue. The indications are, therefore, that the cerebrum would soon have become involved. The right optic nerve shows swelling of the nerve-bundles which encroach on the connective-tissue interspaces. The sheath is slightly distended. The left optic nerve is normal. Diagnosis: Leptomeningitis. Signed: C. W. Kinney, M.D., and E. S. Thomson, M.D.

PAPER:

SYNECHIOTOMY OF THE STAPES FOR IMPROVING THE HEARING IN CHRONIC SUPPURATIVE OTITIS MEDIA RESIDUA.

BY EDWARD BRADFORD DENCH, M.D.

A certain number of cases come under the observation of every otologist in which a purulent inflammation of the middle ear has either undergone spontaneous cure, or where the discharge has ceased, as the result of operative interference. In a large number of these cases, however, the hearing is noticeably impaired. It is not infrequently found that in cases of long-standing the patient complains of a steady deterioration in audition in the opposite ear. An examination of this organ often shows but slight evidence of middle-ear inflammation, when there are decided signs of beginning labyrinthine involvement. The aural surgeon has then to deal not only with the ear which was first diseased, but with that which has become secondarily involved. My own experience has taught me that operative interference

upon one side is followed by extremely beneficial results upon the opposite ear.

By the term synechiotomy I mean the division of adhesions about the stapes. These most usually lie between the posterior crus of the ossicle and corresponding wall of the oval niche; the next most frequent location is between the crura and inferior wall of the niche. Occasionally they are found superiorly and anteriorly.

The operative technique is comparatively simple. The procedure can easily be conducted under cocaine anesthesia, or, if this is found to produce unpleasant constitutional effects, a solution of eucain (*b*) may be used. As this drug causes a hyperemia of the tissues, its application should be followed by an application of a sterilized solution of suprarenal extract. This will sufficiently control the engorgement caused by the eucain to assure a clear view of the field of operation. Prior to any operative procedure of this character the parts should be sterilized by thoroughly mopping out the canal and tympanum with an alcoholic solution of bichloride of mercury, of a strength of 1 to 3000. After the field of operation has been properly prepared, the first step is to divide any adhesions which may lie between the posterior crus of the stapes and the adjacent wall of the oval niche. If a fragment of the drum membrane remains and prevents a clear view of the stapes, it is better to excise this as a primary procedure. In certain cases, owing to the position of the stapes, the ossicle cannot be seen. This is particularly true where posterior adhesions are present, the ossicle being drawn backward behind the tympanic ring. Knowing the normal position of the stapes, it is a comparatively simple matter, after local anesthesia has been thoroughly established, to divide these adhesions, although the ossicle itself may be completely hidden from view. In order to do this a sharp-pointed knife is introduced into the middle ear in the upper and posterior quadrant, close to the tympanic ring. The knife is carried inward until the bony wall of the tympanum is encountered. It is then swept downward, the point being still kept in contact with the internal tympanic wall. In this way all adhesions lying between the posterior crus of the stapes and the adjacent wall of the oval niche are divided, including the tendon of the stapedius muscle. Not infrequently, where the stapes are invisible before the procedure, it is easily seen after the incision has been made, owing to the division of the adhesions which have drawn the

ossicle upward and backward. The operation itself, if carefully conducted, is absolutely painless.

Prior to the operation a careful functional examination should be made, and this should be repeated after each successive step, so as to note the effect upon the lower tone limit and upon the power of audition. It is not uncommon to find a marked improvement in hearing after division of posterior adhesions. If this does not follow, the operator should next pass the knife beneath the crura of the stapes and the adjacent wall of the niche. Careful mobilization of the ossicle by means of the cotton-tipped probe is also advisable, both the hearing and the lower tone limit being tested from time to time to see what improvement follows the procedure.

My own records show twenty-six cases in which operation was done in this manner. Of these, improvement was marked in twenty-five, while in one case no improvement followed the operation.

The after-treatment is exceedingly simple. If the field of operation has been properly sterilized, it is only necessary to occlude the meatus with a pledget of sterilized cotton. This should be changed daily, and at the same time the meatus wiped out with a pledget of sterilized cotton. Frequently there may be a sero-sanguinolent discharge from the ear for from three to four days after the operation; at the end of this time the tympanum becomes dry. I usually direct the patient to keep the meatus occluded while in the open air for at least ten days after the procedure. At the end of four or five days, if there is no discharge, the ear may be left open while the patient is in the house, a cotton pledget being inserted when the patient is in the open air or in a dusty place.

In many instances the effect upon the opposite ear has been exceedingly marked; not only does the hearing improve, but subjective noises are often relieved, and a beginning inflammation of either the labyrinth or the middle ear is effectually curtailed.

DISCUSSION.

Dr. Edward Fridenberg, New York: Mr. President:—I want to speak of the use of cocain and the sterilization of cocain. When eucain b was first introduced, marked circulars were issued, saying that cocain, when sterilized, lost its power and became practically useless. This would be important, if true, as cocain has a number of advantages in operations on the eye, nose and ear,

with eucain b does not possess. But this statement as to the impossibility of sterilizing cocain by boiling, while repeated all over this country and foreign countries, is altogether false. I had a cocain solution boiled one hundred times, to do which and retain it of the original strength it was necessary to add about two-thirds as much water as was first used. Experiments then showed that its anesthetic and mydriatic powers were not impaired in the slightest degree. In other words, cocain solutions can be thoroughly sterilized by boiling without impairing the strength of the cocain.

Dr. James F. McKernon, New York: Mr. President:—In nearly all of the cases I have had, improvement has been marked on the opposite side. Also, I have found the suprarenal extract a valuable adjunct. It is certainly much easier to operate on these cases now than it was a few years ago.

Dr. J. A. Stucky, Lexington: Mr. President:—I would like to ask the Doctor a question. I am frequently asked by patients and physicians: "How do you account for the fact that if you operate on the diseased ear, you will improve the other ear?" Some disturbing trouble in the ear operated upon is relieved and at the same time the hearing in the other ear is improved. How do you account for it?

Dr. E. B. Dench, New York: Mr. Chairman and Gentlemen:—I would first corroborate what Dr. Fridenberg says in reference to cocain. I always boil cocain solutions and always shall. It certainly does not impair their anesthetic power. But there is one thing of which I am not certain and that is that they may be a little more toxic after they are boiled. I do not know whether the Doctor may have observed this. In the cases in which I used boiled cocain solutions, there seems to be greater toxicity.

Dr. Stucky does not need to ask that question at all, for he knows perfectly well the hearing is improved on the other side. It is because of the crossed fibers. Most of the fibers come from the opposite side but a few fibers come from the auditory nerve of the same side. If there is an inflammatory process of long standing with pressure on the labyrinth, degeneration follows. There is degeneration of the fibers to the cortex and the process extends down the nerve to the labyrinth of the opposite side. This has all been proven experimentally. That is the reason why we find labyrinthine and nerve disease developed more frequently than we do in the other cases. They develop out of all proportion, or rather their rapidity of development is out of all proportion to the development of the middle ear process. So that we may briefly say that in any inflammation of the middle ear, we have the disease traveling from the middle ear to the nerve on one side and from the nerve to the middle ear on the other side.

I have in my hand a little article which has served me in very good stead. The chief thing it has to commend it is its simplicity. It is made by the Gorham Company of New York City. It is an ordinary candle that fits into a tube and is kept constantly in posi-

tion by a spring. The reflector is supposed to be parabolic but it is not in this case because this is the first instrument made. Even with this imperfect reflector we have about a four candle power light. The candles are the ordinary stock candles, which is an advantage because you can get them on the shortest notice and it is not necessary to wait for them. I would like to say also, in reference to the candle, that it is made so exactly that every part of the composition is consumed. That is, there are a certain number of grains of composition for every thread in the wick, so the candle is perfectly consumed.

Dr. Robert Levy, Denver: Mr. President:—I am in the habit of using a lamp which to me is much more satisfactory than this would seem to be. It is a little tube, not more than six or eight inches in length, with a very good bull's eye and a dry silver battery in it, which can be replaced at an expense of eight or ten cents. It can be carried in the pocket and is exceedingly useful without any of the inconveniences that attend the oil or the other lamps.

Dr. Chas. W. Richardson, Washington: Mr. President:—The lamp suggested would seem to be very handy not only to the laryngologist but also to a physician when he is going around at night, as an aid to distinguishing the number on the house. He could find the number without going up and striking a match.

PAPER:

SUDDEN DEATH FOLLOWING REMOVAL OF TONSILS.

BY J. A. STUCKY, M.D.

J. A., aged fifteen, consulted me February 21, 1899, giving the following history: Had been in bad health for past two months, though not confined to bed or house; been at school most of the time. Had been suffering with "sore throat, tonsillitis, and quinsy." Had been much worse for past two weeks, the throat trouble being aggravated by "hacking cough." He had been referred to me to have his tonsils and adenoid removed.

Patient showed evidence of genuine illness; rigors and hot flashes at short intervals; pallor, hectic, pulse quick and full; temperature 101° F.; constant headache; characteristic appearance of mouth-breather from adenoid obstruction. Left tonsil enormously enlarged, protruding beyond the median line, of soft,

spongy, and fungous appearance, crypts and follicles filled with pus, evidently oozing from a chronic peritonsillar abscess. Vault of pharynx filled with adenoid vegetations covered with offensive discharge similar to tonsil. Tongue coated and breath offensive. There was no evidence of active inflammation, but on the contrary, a diagnosis of general septicemia due to absorption of retained pus and muco-pus in tonsillar, peritonsillar, and adenoid tissue was made, and removal of diseased and suppurating tissue advised. This was consented to and patient sent to St. Joseph's Hospital. Dr. John Scott, after examination of the patient, said there was no contraindication to administration of anesthetic, and gave him chloroform, after parts had been thoroughly cleansed with antiseptic solution by means of atomizers. Very little anesthetic was needed, and was taken without an unpleasant symptom. The throat being large, every step of the operation was easily and quickly done. The tonsil was removed with tonsillotome, adenoid with Gottstein's curette. There was little more than the usual hemorrhage, and, after spraying parts with iced dioxide hydrogen solution, the patient was put to bed in good condition, and suspecting him to be "a bleeder," I remained an hour and a half after he recovered from the anesthetic, and left him in good condition and quite cheerful. Instructions were left with the nurse to use iced spray (25 per cent. hydrogen dioxide in Seiler's solution) if there was any free oozing of blood.

Within thirty minutes after leaving a hurried telephone message was received, saying the patient had just vomited, and was bleeding profusely from nose and mouth. I was at his bedside within ten or fifteen minutes; the bleeding had checked considerably under the use of the spray. Pulse was quick, expression anxious, great restlessness, and every indication of impending collapse. A hypodermic injection of ergotine, $^1/_{10}$ gr.; strychnia, $^1/_{30}$ gr., and morphia, $^1/_6$ gr. was ordered, while I proceeded to thoroughly remove all blood clots. Examination revealed no special bleeding point, but a very general oozing of venous blood; very little arterial oozing was found.

Most of the bleeding was from the tonsillar and post-pharyngeal surface. After drying the parts, an application of McKenzie's styptic solution, followed by sol. ferri per. sulph., applied by means of cotton-covered probe, effectively stopped all bleeding.

Before completing this treatment Drs. Scott, Kinnaird, and

Patterson arrived, approved of the treatment pursued, and agreed with me that the patient would probably soon react and rally if there was no further bleeding.

After waiting a few moments, the pulse being fairly good, though weak and irregular, it was decided to use transfusion of hot normal salt solution. Within three hours three pints were used subcutaneously and readily (apparently) absorbed. Whisky, strychnia, and digitalis were also given hypodermatically as indicated.

Efforts to sustain life by these means failed, and the patient died nine hours after the operation, and seven hours and a half after the secondary hemorrhage had been entirely controlled. As to the imperative and immediate indication for operation, there is in my mind no doubt. I am equally positive that death in this case was coincident with the operation, the latter being the exciting, not the immediate cause.

It is well known that no operation (when indicated) gives such remarkable results as that for removal of adenoid tissue; also, their removal is always accompanied by very free venous bleeding. In this case the loss of venous blood at the time of the operation was little more than is usually the case, and all bleeding stopped within a short time without use of any styptic except iced spray of dioxide hydrogen and alkaline antiseptic solution.

Within a few moments after appearance of secondary hemorrhage I thoroughly cleansed all bleeding surface, nearly all of which was venous, there being no evidence of a vessel of any size being severed; there was no special bleeding point discovered, but instead a very rapid, free oozing of venous blood, which was easily controlled by the applications of the styptics referred to.

The most plausible theory to my mind as to the cause of death is the entire system, with all its recuperative force, had been so exhausted and undermined by sepsis that reaction was impossible, though every facility for promoting this was easily at hand and freely used. I know of no other way to account for the result, because I do not think enough blood was lost to cause death, and this did not occur for seven and a half hours after the bleeding was completely controlled. Admitting the hemorrhagic diathesis does not account for the unexpected and terrible result.

I am forced to the conclusion in this case I was dealing with a septic condition of affairs, that nothing short of what was done

would have relieved the patient, complicated with a hemorrhagic diathesis, and "that something which passeth understanding."

Lexington, Ky.

DISCUSSION.

Dr. J. E. Sheppard, Brooklyn: Mr. President:—I look upon it as purely a piece of luck that I have not had one of these cases. I have rather a wholesome fear of it, for I am advancing in years and suppose that I must be nearing my fatal case. In order as much as posible to lessen the chances of such a result I am using the galvanocautery more and more.

It seems to me the absorption of toxines or toxic poison must play an important rôle in these cases. I do not think this case would have died but for the toxic poisoning. Those of you who have not seen what the toxines will do, may find it hard to understand. But some of us who have seen even a fifth of a minim of the toxin of erysipelas produce temperatures above 105° will not believe it improbable that this case died from toxin poisoning. Possibly the hemorrhage had something to do with it, but that the patient died from hemorrhage I am very doubtful indeed.

Dr. Robert C. Myles, New York: Mr. President:—Dr. Stucky's case confirms something that I stated yesterday, that is, that general statistics should be considered by each of us.

Had that patient been under our care we would have had the same misfortune. No power could have been brought there to have changed the result. It is very probable that the depressed condition of the child and the extreme condition he was in from the septic poisoning, combined with a reasonable amount of hemorrhage, contributed to the shock. A great many surgeons contend that shock is due only to hemorrhage, but I think there are many things that contribute to it. It is my impression that the boy died of that, combined with his weakened condition.

Dr. T. V. Fitzpatrick, Cincinnati: Mr. President:—I disagree a little with the last speaker in saying that Dr. Stucky needs our sympathy. I think he does not need our sympathy, for he discharged his duty just as he should have done. I recall a case of operation for adenoids, in which I operated in the face of a temperature of 103.5°. After operation and drainage the temperature fell to normal. The case was not complicated by any rise of temperature. I think the Doctor managed his case as well as could be, and under such circumstances the physician must simply "take his medicine," which Dr. Stucky knows how to take very well.

PAPER:

CEPHALAGRA AND TIC-DOULOUREUX FROM ACCESSORY SINUS AFFECTIONS.

BY SARGENT F. SNOW, M.D.

The sympathy and skill of the medical profession has been well tested in the effort to relieve severe paroxysms of cranial and facial pain. No cases appeal to us more than those afflicted with recurring attacks of cephalagra and tic-douloureux, hence I venture to assume that all medical men have more than a passing interest in those affections.

The many and varied analgesics have been tried and worn out, some leaving their imprints on an already weakened constitution, and some a pernicious habit; some perhaps useful in giving a temporary relief from the distressing pains, but all most unsatisfactory as curative agents, until we have dreaded to see these patients enter our office.

Modern research has brought us to a point where it is now quite generally conceded that there is no pain or neuralgia as a disease *per se*. There must be a primitive cause and it is in the search for these primitive causes that this paper is indited.

Two years ago when the American Rhinological, Laryngological and Otological Society met in Washington, the reader had the honor to present a paper under the title of "Headaches from Nasal Causes," in which thirty cases of the ordinary forms of headaches were reported. Seven claimed to have received relief to the extent of about 40 per cent.; five, 75 per cent.; ten, 90 per cent; and eight, 100 per cent. from purely nasal work, all pointing most conclusively to the value of this form of treatment.

In this paper I hope to show my reasons for the opinion that we have just as good a right to expect like results in many extraordinary forms where the patients are even thrown into spasms from the severity of the cranial pain, or into the most intense agony by so-called tic-douloureux.

The connection between disordered states of the upper air-passages and cephalalgias is not so debatable now as in 1893, when a paper on "Hemicrania and Neuralgia," by the author, was brought out. Several essays on headaches by well-known rhinologists have appeared during the past three years, and I expect

the future will prove that others can report well authenticated cases of these more intense forms, for which I have chosen the term cephalagra and tic-douloureux, and, perhaps, have already reported them.

I am not prepared to say that this is the first article calling attention to the relation of pressure within the accessory sinuses to these two troubles; but so far with the limited time and literature at my disposal, I have found no mention of these sources as a probable factor in their production; neither will I presume to say that sinus affections are the only cause of cephalagra and tic-douloureux, but I believe the future will prove that they are determining causes in 75 per cent. of all cases.

It is needless for me to go into detail and show how these reflexes are brought about. You all know the anatomy of the parts I speak of, and the extremely sensitive state a nerve will get into if subjected to severe or constant pressure. This condition of severe and often constant pressure obtains in many of these patients, sometimes from an acute retention of mucus or pus, sometimes from a collection of polyps within the antrum, ethmoid or sphenoidal sinuses.

The reason why collections of mucus, pus or polyps in these cavities cause these most severe paroxysms of headache and tic-douloureux in some, asthma or hay fever in others, and in still others only foul discharges, I will not attempt to explain, but will pass to some of the experiences that led to my present convictions.

About four years ago a relative who had been suffering with neuralgia of the fifth nerve for several months, submitted to an examination of the nose. I expected to find an enlargement sufficient to cause the trouble, but to my disappointment none existed. There was some evidence of sensitive membranes, but no intranasal pressures, and I reluctantly had to refer the case back to the general practitioner. The extreme suffering continued in the manner typical of tic-douloureux until ten months ago when, having had a series of cases exhibiting the same symptoms, in whom I had found ethmoid trouble, I visited the patient with an idea of examining the adjacent sinuses and learned that two weeks previous, following months of acute suffering, there had been a sudden and unexpected relief. An examination at this time showed a nest of small pale tumors that had apparently just broken through the thin wall of bone separating the upper nasal fossa from the ethmoid cavities, and that is exactly what had

occurred. The pent up polyps so long hidden had outgrown their habitat, burst its walls, relieving the pressure, and pain had ceased.

In this connection, I will briefly mention two more similar cases that have come under my notice and even now occasionally visit my office. Each of them had had teeth extracted; antimalarial medication, electricity in its various forms, and the best medical care, but with very little good effect, until as a last resort they were referred to a so-called nose specialist. One, a lady who for eight years had suffered in the most severe way, presented interesting features. It was found that the anterior end of the middle turbinate was much enlarged and grown to the septum. The removal of this enlargement was followed by considerable relief, but not the very marked and satisfactory outcome that followed a complete removal of the entire body opening into the ethmoids and clearing out the polyps in the middle and posterior cells.

The other lady, 62 years of age, was referred to me in much the same manner and suffering, if possible, more intensely. In moist weather she would have ten or twelve seizures a day lasting two minutes, and so severe she was compelled to scream and often go into spasms. This condition was continued with slight variation for fourteen years, never free from twitching pains in the face, nutrition had been seriously impaired for a long time, attempts to masticate food would bring on a paroxysm, compelling the frequent use of a feeding-tube. Examination showed her face to be pale, moist and shiny, with marked swelling outward of the bridge of nose. The right middle turbinate body was of tremendous size, effectively blocking secretions; this was removed and the ethmoid region opened. The operation was followed by only about 50 per cent. relief, until two months later I entered the posterior cells, curetted the degenerated membranes, and enlarged the sphenoidal opening with most beneficial results.

These abnormal states of the deep sinuses, varying as stated before from simple inflammation of their lining to collection of mucus, pus or polyps, obtain and are the cause of many of our cases of acute hemicrania that persist in some degree after a thorough removal of nasal overgrowths. Endo-ethmoidal or endo-sphenoidal pressures seem also to be a large factor in the cause of the paroxysmal headaches, termed cephalagras, which were mentioned in the early part of this paper.

A detailed recital of cases representing this class might weary you and I will only touch on two of the most extreme that have come to my notice. Both were ladies between thirty-five and forty years of age, giving a history of long and severe suffering from the head pains, so intense at or near the menstrual periods that coma and opisthotonos would supervene. In each there was marked uterine trouble co-existent with an intra-nasal and sinus affection. In one, the only attempt thus far has been toward an improved pelvic state, which has modified but never prevented the cephalagric seizures.

With the other case the obstructions were removed, good intranasal tone and drainage secured, and while these were maintained, none of the paroxysms recurred, but with each lighting up of the pelvic inflammation there was marked thickening of the nasal membranes and a strong tendency to headache, which would and did come unless the respiratory tract was kept free and toned up by treatment. Upon the advice of her physician, she submitted to an operation for the repair of a lacerated cervix and the benefit from our combined effort has been marked. He reports that the uterus has become smaller; there is good nasal respiration and drainage at all times with no tendency for headaches.

Such proofs as these, and the marked benefit that follows correction of intranasal states in patients who suffer with those common uterine symptoms, pain or pressure on the vertex, have a strong tendency to make the specialist extravagant in his claims. We don't know but that it will be found that an intermediate, removable nasal factor exists in all headaches (except, perhaps, the occipital) that are associated with pelvic disorders. To be more explicit: It seems that a deranged organic function with congestion promotes thickening of the nasal membranes, so that surfaces abnormally close press upon each other, causing various reflex disturbances.

Every patient suffering from cephalagra or tic-douloureux does not show an intranasal growth, but, unsuspected, as in the one first mentioned, we may find an ethmoid full of polyps; neither do all cases respond promptly to operative procedures, doubtless because it is almost impossible to reach every region of pressure at one or two sittings. Further than that there may be some areas which we do not wish to meddle with, being of a less chronic order and which can be left for the improvement that follows removal of the worst features. Conservatism is com-

mendable, if not carried too far, but it should be borne in mind that only slight contact between surfaces may create a profound disturbance where nerves are in such a hypersensitive state.

I would especially emphasize the following observation, as it is one on which may hinge our ultimate success or failure, *i. e.*: Relapses may occur, as it is still possible for neighboring sinuses to become occluded if habits and environment remain unchanged, therefore education in personal hygiene is absolutely imperative, or we may have to be satisfied with modified result.

Digestive disorders, lack of exercise, or a sluggish surface reaction play an important part, and with each of these attacks, symptoms of the old trouble are liable to return; indeed, it is a revelation to see the increased thickness of the membranes, with consequent blocking of secretion, that occurs as the result of these states and no permanent benefit may come from their correction before nasal work, but after nasal work complete success is possible.

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RESPONSE DU DR. E. J. MOURE, DE BORDEAUX.

Question 1. Quelle Experience Avez-vous des Nouveaux Anesthésiques Locaux (Eucaine, tropococaine, etc.)?

Response.—J'ai eu l'occasion d'employer l'eucaïne ou ses dérivés comme anesthésiques locaux et j'ai constaté que, contrairement à ce qu'ont affirmé certains auteurs, elle produisait la rétraction de la muqueuse sur laquelle on la déposait. L'anesthésie m'a paru être aussi complète qu'avec le chlorhydrate de cocaine, mais elle ne m'a pas semblé offrir d'avantages bien sérieux sur ce dernier proudit, car j'ai observé avec son emploi les mêmes incidents que j'avais constantés avec l'usage des sels de cocaine.

Je n'ai pas d'expérience personnelle sur la tropacocaine dont le prix était un peu élevé au moment où je voulais en faire l'essai, et je n'ai pas cru devoir poursuivre, étant donné que nous avions sous la main un anesthésique parfait auquel il ne me paraissait pas utile de chercher de succédané.

Question 2. Avez-vous Observé Quelques Mauvais Effets de L'Emploi Local des Anesthésiques, y Compris les Sels de Cocaine, dans les Cas Operatoires, et si oui, Quels sont ces Mauvais Effets?

Response.—Les sels de cocaine, employés même larga manu, dans le larynx ou l'arrière-gorge, ne m'ont jamais semblé avoir le moindre inconvénient; chez quelques malades un peu sensibles, l'anesthésie de l'arrière-gorge, au lieu de faciliter l'inspection du larynx, l'a quelquefois rendue très difficile, car l'anesthésie prouduisait une sorte de sensation de corps étranger de l'arrière-gorge, qui incitait les malades à faire des efforts, quelquefois même a vomir, au point que l'examen était rendu plus difficile l'anesthésie locale, qu'il ne l'eût été auparavant.

De même dans l'oreille, la cocaine employée à dose massive ne m'a jamais paru avoir d'inconvénient.

Par contre, du côté de la muqueuse nasale, il est certain que l'anesthésie complète des cornets inférieurs et d'une zone un peu étendue du nez, provoque très facilement des syncopes ou un état syncopal, chez les malades qui ont besoin d'être opérés dans ces régions.

Quelquefois même j'ai pu me demander si c'était bien à la cocaine qu'il fallait attribuer l'état syncopal observé chez certains malades, ou à l'emotion causée par la vue des instruments

ou l'opération elle-même. La fréquence de ces troubles généraux a été trop considérable et observée un peu chez toutes les catégories de malades, pour que je ne sois pas obligé d'admettre que c'est bien à l'anesthésique qu'il faut attribuer les troubles de la circulation constatés chez ces malades. C'est ainsi que j'ai vu des hommes très vigoureux et très énergiques résistant à l'intervention, avoir malgré eux un état syncopal qui obligeait à suspendre l'opération pour les mettre dans la situation horizontale. Je dois dire du reste que je n'ai jamais eu à déplorer le moindre accident grave, car tout s'est bourné à un état syncopal plus ou moins prononcé, que la mise du malade en position horizontale suffisait à faire disparaître très rapidement, sans l'administration d'aucune espèce de médicament reconstituant.

Un fait certain également est que les malades profondément anesthésies, ne se plaignant pas durant l'intervention, ont plus facilement de la syncope que les nerveux et les agités qui pendant toute l'intervention poussent des cris ou se remuent; chez ces derniers je n'ai jamais observé de troubles quelconques consécutifs à l'anesthésie: on aurait pu croire que c'est parce que la cocaine agissait moins, était moins absorbée, mais somme toute, une fois l'opération terminée (opération sanglante, galvanocaustie, etc.), ces patients avouaient n'avoir éprouvé aucune sorte de douleur: ils avaient donc bénéficié de l'emploi de l'anesthésique local.

Question 3. Avez-vous Observé le Retour Végétations Adénoides du Naso-pharynx et a Quelle Cause L'Attribuez-vous?

Résponse.—J'ai fait à ma clinique de la Faculté de Bordeaux le relevé de la plupart des malades opérés de végétations adénoides que j'ai eu ensuite l'occasion de revoir, soit un mois, soit plusieurs mois après leur opération; j'ai noté chaque fois consciencieusement l'état du naso-pharynx *aussitôt* après l'intervention et *au moment* où j'avais l'occasion de revoir les malades; je ne puis actuellement fournir de données exactes sur le nombre de cas dans lesquels je suis certain d'avoir vu la repullulation se produire (je prépare du reste un relevé statistique et un travail à ce sujet, qui paraîtra sous peu, lorsque mon relévé sera complètement terminé); mais ce que je puis dire et déjà affirmer, c'est que, dans certains cas, *malgré l'intervention radicale, j'ai vu les végétations se reproduire presque aussi volumineuses qu'après la première opération* et dans ce cas il ne saurait être question de parties de tissu adénoide oubliées dans le naso-pharynx au moment de l'in-

tervention car les végétations nouvelles étaient beaucoup trop volumineuses et occupaient la partie moyenne du naso-pharynx, c'est-à-dire celle qui a le plus de chances d'être parfaitement curettée au moment de l'intervention. C'est en général chez les enfants lymphatiques, ou à la suite de fièvres éruptives, rougeole en particulier, scarlatine quelquefois, que j'ai vu se faire cette repullulation chez d'anciens opérés d'adénoides.

De même, lorsqu'on opère de tours jeunes enfants, soit à la mamelle, soit au-dessous de l'âge de trois ans, il n'est pas extrêmement rare de constater chez ces mêmes sujets, vers l'âge de 7 ou 8 ans, la présence d'une nouvelle amygdale hypertrophiée, surtout lorsque ces malades ont eu dans l'intervalle l'une des fièvres éruptives auxquelles j'ai fait allusion plus haut.

Par contre, la plupart des végétations adénoides reconnues comme tuberculeuses à l'examen histologique n'ont pas offert la moindre trace de récidive chez aucun de mes opérés. J'estime que pour affirmer la repullulation du tissu adénoide il est de toute nécessité, aussitôt après l'intervention chirurgicale de passer, *avec soin*, le doigt dans le naso-pharynx et de voir l'état dans lequel on laisse cette cavité; il arrive en effet très souvent que malgré le curettage le plus soigneux et le plus radical on laisse encore sur les parties latérales, autour orifices tubaires ou choanaux quelquefois, de petites granulations, véritables petites végétations, qu'il n'est pas possible d'enlever à l'adanotome et qui peuvent dans certains cas, et sous certaines influences, devenir le point de départ d'une repullulation plus ou moins volumineuse.

Je le répète, je me propose de publier prochainement un travail sur la question; je me borne donc à répondre d'une façon générale aux questions qui m'ont été posées.

J'espèce descrires 62 à 63 végétation chaque au cas et mastatatique porte sur des 1900 Apr. 25.

Dr. E. J. Moure.

Bordeaux, 7 Mars, 1899.

IN MEMORIAM.

Dr. D. A. Hengst was present at each session of the Society at the annual meeting in 1898 held in Pittsburg, Pa.

The last scientific paper presented by him was read by an intimate friend, very few of his colleagues knowing that he was then suffering from an affection of the larynx.

He bravely closed his business and went to Colorado with a hopeful feeling that his health would be restored and that he might again take up the work to which he was devoted. He died at Denver, Col., in the spring of 1899.

Though never strong or robust he enjoyed an extensive and lucrative practice. His patients were attached to him and grieved over his untimely death. He was a diligent student, a successful physician and a skilful operator, thoroughly loyal to his friends and fond of his profession.

He met death without a murmur or complaint.

The Society has lost an upright and honorable member.

His associates place this brief tribute to his memory in the records of the Society.

WHEREAS: In the death of Dr. James E. H. Nichols, which occurred on September 10, 1898, this Society lost one of its charter members who by reason of his high character, education and persistent effort for the advancement of scientific work as well as for the relief of suffering, and

WHEREAS: Dr. Nichols had by his efforts helped to place this Society on a high plane among societies of like interests, thus endearing himself to the Society as a whole as well as to its individual members,

Be It Resolved, That the American Laryngological and Rhinological and Otological Society avows its grief in the loss of a respected and loved fellow, and also be it resolved that a copy of the resolutions be spread upon the minutes of this meeting and that a copy be sent to Dr. Nichols' family.

FIFTH ANNUAL MEETING.

The Fifth Annual Meeting of the American Laryngological, Rhinological and Otological Society convened in the Assembly Rooms of the Grand Hotel, Cincinnati, and was called to order at 10:30 A.M., Friday, June 2d, 1899, by the President, S. E. Solly, M.D.

The President read a letter from Dr. Scheppegrell, a telegram from Dr. Wagner, and a communication from Dr. Koyle.

The roll call was responded to by the following Fellows:

Price Brown, M.D., Toronto, Canada.
Lewis C. Cline, M.D., Indianapolis, Ind.
H. Holbrook Curtis, M.D., New York.
Ewing W. Day, M.D., Pittsburg, Pa.
E. B. Dench, M.D., New York City.
Arthur B. Duel, M.D., New York City.
T. V. Fitzpatrick, M.D., Cincinnati.
Edward Fridenberg, M.D., New York City.
D. Braden Kyle, M.D., Philadelphia.
Robert Levy, M.D., Denver.
H. W. Loeb, M.D., St. Louis.
G. Hudson Mackuen, M.D., Philadelphia.
Jas. F. McKernon, M.D., New York City.
Robert C. Myles, M.D., New York City.
Wendell C. Phillips, M.D., New York City.
Geo. L. Richards, M.D., Fall River, Mass.
Chas. W. Richardson, M.D., Washington, D. C.
S. E. Solly, M.D., Colorado Springs.
Howard S. Straight, M.D., Cleveland, O.
J. A. Stucky, M.D., Lexington, Ky.
John A. Thompson, M.D., Cincinnati.
Max Thorner, M.D., Cincinnati.

Reception of Guests.

Dr. Max Thorner moved that the courtesies of the floor be extended to Dr. Johnston and Dr. Lyle of Cincinnati.

By resolution candidates for membership were permitted to engage in the discussion of subjects before the Society.

Dr. E. W. Mitchell, President of the Cincinnati Academy of Medicine, was introduced by Dr. Thorner and spoke as follows:

I am very happy to have the honor of the invitation and the

introduction to the members of this Society. We welcome you to our city, and I extend to you on behalf of the Academy of Medicine an invitation to remain over until next Monday evening and attend the meeting of the Society.

The roll, the formal proceedings were opened by the address of the President.

An exhibition of cases and the presentation of instruments then took place, followed by the papers appointed for the morning.

Business Meeting, 3.15 P. M.

The first order of business was the election of Fellows. The following candidates, whose names had been proposed in due form by the Council, were then elected to active fellowship in the Society: E. C. Ellet, M.D., Memphis, proposed by Dr. C. Thigpen and Dr. Myles; Fayette C. Ewing, M.D., St. Louis, proposed by Dr. Loeb and Dr. Richardson; Wm. D. Babcock, M.D., H. Bert Ellis, M.D., E. W. Fleming, M.D., Los Angeles; I. A. Black, M.D., Sampson Trask, M.D., Redmond W. Payne, M.D., George W. Merritt, M.D., San Francisco, and A. B. Kibbe, Washington, all proposed by Dr. Wagner and Dr. Martin; Herbert I. Clough, M.D., proposed by Dr. Libby and Dr. Phillips; W. J. Atkinson, M.D., New Jersey, proposed by Dr. Johnson and Dr. Myles; Christopher P. Linehart, M.D., Columbus, Ohio, proposed by Dr. McKernon and Dr. Duel; John B. Rae, M.D., New York, proposed by Dr. McKernon and Dr. Phillips; Burnett C. Collins, M.D., Brooklyn, proposed by Dr. Sheppard and Dr. Myles; Joseph A. Kenefick, M.D., New York, proposed by Dr. Dench and Dr. McKernon; M. A. Goldstein, M.D., St. Louis, Mo., proposed by Dr. Scheppergrell and Dr. Loeb; William P. Brandegee, M.D., New York, proposed by Dr. Dench and Dr. McKernon; James Spaulding, M.D., Maine, proposed by Dr. Kimball and Dr. Phillips; Dr. Norton, Maine, proposed by Dr. Holt and Dr. Hill; Carl Barck, M.D., St. Louis, proposed by Dr. Loeb and Dr. Thorner; Oliver H. Jackson, Fall River, proposed by Dr. Geo. L. Richards and Dr. J. E. Sheppard; E. B. Heckel, M.D., Pittsburg, proposed by Dr. E. W. Day and J. E. Willetts; Joseph S. Gibb, M.D., George C. Stout, M.D., Philadelphia, proposed by Dr. D. Braden Kyle ond R. C. Myles.

Dr. Dench proposed that the Secretary cast the ballot for the election of all candidates whose names have been read. The motion was seconded and carried and the ballot duly cast.

Proposed amendment to the By-Laws:

The reading of no single thesis shall occupy more than twenty minutes. In the discussion no member shall speak for more than five minutes, unless the time be extended by a vote of the members present.

The motion was put, as amended, and carried.

Dr. Phillips moved that the chairman appoint the Secretary and one other member of the present council a committee of two to draft a form or forms that will cover the necessary qualifications that we consider a man should have to become a member of this Society, those qualifications to cover the recommendations to be made by the proposer and seconder, and also the information we desire about the candidates themselves; and that in future it become one of the by-laws that we require such blanks to be filled. I move that we adopt the recommendation.

Seconded and carried.

Dr. Loeb moved that the Committee on Nominations add to their labors, nominations on the Library and Publication Committees.

The motion was seconded and carried.

Dr. Curtis moved that the publishing of the papers and proceedings of the Eastern Section in the Transactions this year be referred to the Committee on Publication. Seconded and carried.

It was proposed and seconded to change the Constitution in Article 4, Section 1, which now reads "and a Secretary-Treasurer," to a Secretary and a Treasurer.

It was moved that the next meeting take place in Philadelphia.

Seconded and carried.

Dr. Chas. W. Richardson, Dr. Edward Fridenberg and Dr. J. A. Stucky were appointed by the President to serve as Auditing Committee.

The following committee of five was elected to nominate officers for 1899-1900: Dr. G. Hudson Mackuen, Dr. T. V. Fitzpatrick, Dr. James F. McKernon, Dr. E. B. Dench, Dr. Ewing W. Day.

Secretary's Report.

The Secretary takes pleasure in presenting to the Society a copy of the Transactions of the Pittsburg meeting. The gentlemen elected to active membership in the Society have all qualified except one. We have two resignations, Dillon Brown, New York, and G. R. MacDonough of Toronto. The Society has lost by

death two of its members: Dr. J. E. Nichols of New York City and Dr. D. A. Hengst of Pittsburg. With the newly elected members we have 184.

Treasurer's Report.

Receipts.		
Balance from 1898 account	$218 46	
From dues	659 00	
		$877 46
Disbursements.		
Rooney & Otten, bill for Trans. (500 copies) for 1898 (less cloth binding on 200.. copies), mailing and addressing	342 73	
Geo. L. Goodman & Co., printing letterheads on envelopes, programs, etc	84 80	
H. L. Andrews, stenography service, Pittsburg	50 00	
Miss G. Nevins, work on Transactions	50 00	
Miss Johnson, extra typewriting	10 00	
Dr. Richardson and Dr. Wagner, expenses of section meetings	50 00	
Binding and Printing Transactions	17 73	
Snyder & Black, engraving certificates	12 75	
Stamps	17 25	
Incidentals	22 13	
		$657 39
	$877 46	
	657 39	
Balance to credit	$220 07	

J. A. Stucky,
Chas. W. Richardson,
Edward Fridenberg,
Auditing Committee.

The Treasurer's books show that there were due from delinqu ent members $635.00, making a total of about $855.00 due the Society.

The Auditors reported that the books had been examined and found correct. On motion, the reports of the Secretary, Treasurer and Auditing Committee were accepted.

The Committee on Nominations reported the following names for officers for 1899-1900.

President.—D. Braden Kyle, M.D.

Vice-Presidents.—G. Hudson Makuen, M.D.
Howard S. Straight, M.D.
Robert Levy, M.D.
J. A. Stucky, M.D.

Secretary and Treasurer.—Robert C. Myles, M.D.

Council.—W. H. Daly, M.D.
S. E. Solly, M.D.
A. W. Calhoun, M.D.
J. B. Clemens, M.D.
J. F. McKernon, M.D.
W. C. Phillips, M.D.
J. E. Sheppard, M.D.
Price Brown, M.D.
Max Thorner, M.D.

The Committee on Nominations reported the following names for the Library and Publication Committee.

Library Committee.—H. H. Curtis, M.D.
A. B. Duel, M.D.
H. A. Alderton, M.D.
J. S. Mabon, M.D.
H. W. Loeb, M.D.

Sub-Committee on Publication.—H. Holbrook Curtis, M.D.
A. B. Duel, M.D.
H. A. Alderton, M.D.

On motion the Secretary was instructed to cast the ballot of the Society for the officers as named in the list proposed by the Nominating Committee.

A unanimous vote of thanks was extended to the Committee for the generous and admirable way in which provision had been made for the entertainment in Cincinnati, and also for the careful and painstaking way in which they have performed their duties.

Dr. Geo. L. Richards moved that the Society offer a vote of thanks to Dr. Solly for the able, judicious and careful manner in which he has piloted us through the maze of this meeting. Seconded and carried.

After the installment of the newly elected officers, and a short speech by the incoming President, the Society adjourned to meet the following year in Philadelphia.

FELLOWS.

ELECTED.

1898. Abrams, Alva E., 78 High St., Hartford, Conn.
1895. Adams, John L., 24 East 46th St., New York, N. Y.
1898. Alderton, H. A., 138 Clinton St., Brooklyn, N. Y.
1895. Arnold, J. Dennis, 530 Sutter St., San Francisco, Cal.
1899. Atkinson, William J., 111 N. Main St., Paterson, N. J.
1895. Bartlett, Edwin W., 422 Jefferson St., Milwaukee, Wis.
1896. Battle, S. Westray, 13 Church St. Asheville, N. C.
1895. Berens, Bernard, 2002 Chestnut St., Philadelphia, Pa.
1895. Berens, T. Passmore, 101 Park Ave., New York, N. Y.
1895. Billings, John H., 321 Lexington Ave., New York, N. Y.
1899. Black, James A., 406 Sutter St., San Francisco, Cal.
1898. Braislin, W. G., 217 St. James Place, Brooklyn, N. Y.
1899. Brandegee, William P., 17 West 46th St., New York, N. Y.
1896. Brown, Lennox, 15 Mansfield St., London, Eng.
1898. Brown, Price, 37 Carlton St., Toronto, Ontario, Canada.
1897. Bulette, Wilbur W., 5th and Santa Fe Aves., Pueblo, Colo.
1895. Calhoun, A. W., 62 Marietta St., Atlanta, Ga.
1895. Chapman, S. Hartwell, 193 Church St., New Haven, Conn.
1895. Cheatham, Wm., 303 West Chestnut St., Louisville, Ky.
1895. Christy, T. C., 42-43 Westinghouse Building, Pittsburg, Pa.
1895. Clemens, James B., 19 East 38th St., New York, N. Y.
1896. Cline, Lewis C., 224 N. Meridian St., Indianapolis, Ind.
1899. Clough, Herbert I., Bangor, Maine.
1897. Cobb, Frederick C., 11 Marlborough St., Boston, Mass.
1895. Coffin, Lewis A., 145 West 12th St., New York, N. Y.
1895. Coggeshall, Henry, 102 East 57th St., New York, N. Y.
1899. Collins, Burnett C., 1263 Dean St., Brooklyn, N. Y.
1896. Cox, Charles N., 257 Jefferson Ave., Brooklyn, N. Y.
1897. Crockett, Eugene A., 226 Marlborough St., Boston, Mass.
1895. Culbert, Wm. Ledie, 118 Madison Ave., New York, N. Y.
1895. Curtis, H. Holbrook, 118 Madison Ave., New York, N. Y.
1895. Dabney, S. G., 216 West Chestnut St., Louisville, Ky.
1896. Daly, Wm. H., 516 Market St., Pittsburg, Pa.
1895. Day, Ewing W., Westinghouse Building, Pittsburg, Pa.
1895. Dench, E. B., 17 West 46th St., New York, N. Y.
1895. Dessar, L. A., 156 West 58th St., New York, N. Y.
1896. Douglas, O. B., 123 East 36th St., New York, N. Y.
1898. Douthett, J. M., Smith Block, 219 6th St., Pittsburg, Pa.

1898. Duel, Arthur Baldwin, 254 Madison Ave., New York, N. Y.
1895. Dunn, John, 314 East Franklin St., Richmond, Va.
1899. Ellis, H. Bert, 246 Bradbury Block, Los Angeles, Cal.
1895. Evans, T. C., 410 West Chestnut St., Louisville, Ky.
1895. Fitzpatrick, T. V., 32 Eighth St., Cincinnati, O.
1899. Fleming, Ernest W., 184 Bradbury Block, Los Angeles, Cal.
1895. Freeman, Walter J., 1702 Locust St., Philadelphia, Pa.
1895. Fridenberg, Edward, 242 Lenox Ave., New York, N. Y.
1895. Frothingham, Richard, 19 East 38th St., New York, N. Y.
1897. Fryer, B. E., 520 East 9th St., Kansas City, Mo.
1896. Fulton, John F., 350 St. Peter St., St. Paul, Minn.
1899. Gibbe, Joseph S., 1803 Chestnut St., Philadelphia, Pa.
1897. Gildea, P. F., 2 Cascade Ave., Colorado Springs, Colo.
1899. Goldstein, Max A., 3702 Olive St., St. Louis, Mo.
1896. Gougenheim, Achille, Paris.
1896. Grant, Dundas, London.
1896. Grayson, Charles P., 251 South Sixteenth St., Philadelphia, Pa.
1896. Green, J. Orne, 182 Marlborough St., Boston, Mass.
1897. Grove, G. W., 206 Rialto Building, Kansas City, Mo.
1896. Gruber, Joseph, Vienna.
1895. Haddock, Chas. W., 14 Bartlett St., Beverly, Mass.
1895. Hall, G. P., Galveston, Texas.
1895. Halstead, Thomas H., 831 University Block, Syracuse, N. Y.
1899. Heckel, Edward B., 524 Penn Ave., Pittsburg, Pa.
1895. *Hengst, D. A., 515 Penn Ave., Pittsburg, Pa.
1895. Hepburn, Neill J., 317 West 23d St., New York, N. Y.
1896. Heryng, T., Warsaw.
1896. Hill, J. F., 119 Main St., Waterville, Me.
1896. Hinkel, F. W., 305 Delaware Ave., Buffalo, N. Y.
1895. Hobbs, Arthur G., Atlanta, Ga.
1895. Hodges, R. C., 520 Travis St., Houston, Texas.
1895. Holt, E. E., Portland, Me.
1896. Hopkins, Wm. E., 803 Sutter St., San Francisco, Cal.
1898. *Hopkins, Woolsey, 28 West 45th St., New York, N. Y.
1895. Hubbard, Dwight L., 117 West 93d St., New York, N. Y.
1895. Hyatt, Franck, 1022 14th St., N.W., Washington.
1895. Jack, F. L., 215 Beacon St., Boston, Mass.
1899. Jackson, Oliver H., 34 N. Main St., Fall River, Mass.
1896. Joachim, Otto, 124 Baronne St., New Orleans, La.
1896. Joal, Joseph, Paris.
1896. Johnson, Walter B., Paterson, N. J.
1896. Karwowski, Coastantis, Warsaw.

1899. Kenefick, Joseph A., 29 West 36th St., New York, N. Y.
1899. Kibbe, A. B., Bailey Building, Seattle, Wash.
1896. Kimball, Irving E., 702 Congress St., Portland, Me.
1896. Kinney, C. W., 117 West 93d St., New York, N. Y.
1895. Kirkpatrick, E. A., Pleasant St., Halifax, N. S.
1896. Knowles, W. F., 220 Clarendon St., Boston, Mass.
1897. Koyle, F. H., 199 Main St., Hornellsville, N. Y.
1896. Kyle, D. Braden, 1517 Walnut St., Philadelphia, Pa.
1895. Landfried, C. J., 136 Gravier St., New Orleans, La.
1896. Lederman, M. D., 38 East 60th St., New York, N. Y.
1897. Lester, John C., 179 Schermerhorn St., Brooklyn, N. Y.
1895. Levy, Robert, 300 California Building, Denver, Colo.
1896. Lewis, Robert, Jr., 48 West 40th St., New York, N. Y.
1897. Libby, George F., Colorado Springs, Colo.
1899. Linehart, Christopher P., Hotel Vendome, Columbus, O.
1895. Loeb, H. W., 303 N. Grand Ave., St. Louis, Mo.
1895. Logan, James E., 1208 Wyandotte St., Kansas City, Mo.
1896. Luc, H., Paris.
1895. Mabon, John S., 515 Penn Ave., Pittsburg, Pa.
1896. Macintyre, John, Glasgow, Scotland.
1896. Malcolm, P. E. D., 118 Madison Ave., New York, N. Y.
1896. Makuen, G. Hudson, 1419 Walnut St., Philadelphia, Pa.
1896. Martin, A., Paris.
1896. Martin, W. A., Spring Valley Building, San Francisco, Cal.
1897. McAuliffe, G. B., 59 East 65th St., New York, N. Y.
1896. Mial, L. L., 145 West 12th St., New York, N. Y.
1895. Miller, Frank E., 68 West 37th St., New York, N. Y.
1896. Miller, Lewis H., 14 Spencer Pl., Brooklyn, N. Y.
1895. Morgenthau, George, Venetian Building, Chicago, Ill.
1898. Moure, E. J., Bordeaux, France.
1897. McKernon, James F., 62 West 52d St., New York, N. Y.
1897. McReynolds, John O., Dallas, Texas.
1895. McShane, Augustus, 403 Baronne St., New Orleans, La.
1897. Mullen, J. Aloysius, Houston, Texas.
1895. Munger, Carl E., Waterbury, Conn.
1895. Myles, Robert C., 46 West 38th St., New York, N. Y.
1895. *Nichols, J. E., 4 East 43d St., New York, N. Y.
1899. Norton, Charles E., Lewiston, Me.
1895. *Noyes, J. I., 53 Jackson St., Providence, R. I.
1895. *O'Dwyer, Joseph, 967 Lexington Ave., New York, N. Y.
1896. Onodi, Adolph, Budapest.
1896. Owsley, Frederick, 100 State St., Chicago, Ill.

1896. Parker, Edward F., 70 Hasell St., Charleston, S. C.
1899. Payne, Redmond W., 1135 Geary St., San Francisco, Cal.
1895. Phillips, Wendell C., 350 Madison Ave., New York, N. Y.
1896. Pierce, Norval H., 31 Washington St., Chicago, Ill.
1896. Politzer, A., Vienna.
1895. Pooley, Thomas R., 107 Madison Ave., New York, N. Y.
1896. Powell, Stephen C., Newport, R. I.
1895. Quinlan, F. J., 33 West 38th St., New York, N. Y.
1897. Rankin, D. N., 273 Western Ave., Allegheny, Pa.
1895. Ray, J. M., 414 Chestnut St., Louisville, Ky.
1895. Renner, W. Scott, 361 Pearl St., Buffalo, N. Y.
1895. Reuling, George, 103 West Monument St., Baltimore, Md.
1898. Richards, George L., 84 N. Main St., Fall River, Mass.
1895. Richardson, Charles W., 1102 L St. N.W., Washington, D. C.
1899. Rae, John E., 668 East 157th St., New York, N. Y.
1895. Roe, John O., 28 North Clinton St., Rochester, N. Y.
1898. Rogers, Frederick T., 117 Broad St., Providence, R. I.
1895. Roosa, D. B., St. John, 20 East 30th St., New York, N. Y.
1896. Root, Arthur G., 46 Eagle St., Albany, N. Y.
1896. Ross, George T., 945 Dorchester St., Montreal.
1895. Roy, C. Dunbar, Grand Opera House, Atlanta, Ga.
1895. Schadle, J. E., Lowry Arcade, St. Paul, Minn.
1895. Scheppegrell, William, Medical Building, New Orleans, La.
1898. Schimegelow, E., Copenhagen, Denmark.
1895. Seiss, Ralph W., 213 S. 17th St., Philadelphia, Pa.
1895. Seiler, Carl, 316 S. 15th St., Philadelphia, Pa.
1898. Sendziack, Dr., Poland.
1898. Shattuck, S. Jr., 147 Remsen St., Brooklyn, N. Y.
1895. Sheppard, J. E., 135 Clinton St., Brooklyn, N. Y.
1895. Smith, S. Mac Cuen, 1502 Walnut St., Philadelphia, Pa.
1895. Smith, W. Harvey, 280 Donald St., Winnipeg.
1896. Smyly, Sir Philip, Dublin.
1896. Snow, Sargent F., 204 E. Jefferson St., Syracuse, N. Y.
1895. Solly, S. E., 2 N. Cascade Ave., Colorado Springs, Colo.
1896. Sprague, Frank B., 27 Stewart St., Providence, R. I.
1895. Straight, Howard S., "The Hicox," Cleveland, O.
1899. Stout, George C., 34 S. 18th St., Philadelphia, Pa.
1895. Stucky, J. A., Lexington, Ky.
1896. Taylor, George A., 46 West 36th St., New York, N. Y.
1895. Thigpen, C. A., 13 South Perry St., Montgomery, Ala.
1896. Thigpen, F. M., Montgomery, Ala.
1895. Thompson, John A., 628 Elm St., Cincinnati, O.

1897. Thompson, J. C., Second National Bank Building, Pittsburgh, Pa.
1895. *Thorner, Max, "The Groton," 7th and Race Sts., Cincinnati, O.
1896. Thrasher, A. B., "The Groton," N.E. cor. 7th and Race Sts., Cincinnati, O.
1896. Tiffany, Flavel B., 1235 Grand Ave., Kansas City, Mo.
1896. Turnbull, Thomas, 314 Western Ave., Allegheny, Pa.
1899. Trask-Sampson, 549 Geary St., San Francisco, Cal.
1896. Vansant, E. L., 1929 Chestnut St., Philadelphia, Pa.
1896. Wagner, Henry L., 522 Sutter St., San Francisco, Cal.
1895. Ward, M. R., 303 Collins Ave., Pittsburgh, Pa.
1898. Wenner, Ralph J., 1051 Superior St., Cleveland, O.
1896. Whistler, W. McNeill, 17 Wimpole St., Cavendish Square, London.
1895. White, Joseph A., 200 East Franklin St., Richmond, Va.
1896. Willetts, Joseph E., Westinghouse Building, Pittsburgh, Pa.
1895. Winslow, John R., 924 McCullough St., Baltimore, Md.
1896. Wilson, Norton L., Elizabeth, New Jersey.
1896. Woakes, Edward, 78 Harley St., London, W., Eng.
1896. Wolfenden, R. Norris, London.
1898. Woodward, John T., Norfolk, Va.

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*Deceased.

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